JANUARY. 1930

25 Cents, \$1 a Year

Contractors Engineers Monthly

A Long S-curve Near the Savoy End of the D'Onfro Bros. Contract in Rebuilding the Famous Mohawk Trail in Western Massachusetts with Penetration Macadam

SEE HERCULES ENGINES



AT THE ROAD SHOW

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Canton, Ohio, U. S. A.

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HERCULES ENGINES

Vol. XX, No. 1 CONTRACTORS AND ENGINEERS MONTHLY, JANUARY, 1930

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A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure

information about construction equipment.

The Index of Advertisers faces the inside back cover. When writing to advertisers please mention the CONTRACTORS & ENGINEERS MONTHLY. A star (*) before the manufacturer's e indicates that his advertisement appears in this issue.

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

AIR COMPRESSORS

*Allis-Chalmers Mfg. Co., Milwaukee
*Buhl Company, Chicago
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Independent Pn. Tool Co., Chicago
*Nove Engine Co., Lansing, Mich.
*Stover Mfg. & Eng. Co., Freeport, III.
*Stover Mfg. & Eng. Co., Stover, N. Y.
*Curtis Pneumatic Machy. Co., St. Louis, Mo.
*Chicago Pneumatic Tool Co., N. Y.
*Curtis Pneumatic Machy. Co., St. Louis, Mo.
*De Laval Steam Turbine Co., Tool, Tool

Pa. Worthington Pump & Machinery Corp., N. Y.

AIR COMPRESSORS, PORTABLE AIR COMPRESSORS, PORTABLE

*Buhl Co., Chicago

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Independent Pn. Tool Co., Chicago

*Metalweid, Inc., Philadelphia, Pa.

*O. K. Clutch & Mach. Co., Columbia, Pa.

*Sullivan Machinery Co., Chicago

Chain Belt Co., Milwaukee, Wis.

Chicago Pneumatic Tool Co., New York

Curtis Pneumatic Machy. Co., St. Louis, Mo.

Gardner-Denver Co., Quincy, Ill.

Ingersol-Rand Co., New York

National Brake & Electric Co., Milwaukee

Schramm, Inc., West Chester, Pa.

ARTESIAN WELL DRILLS & PUMPS American Well Works, Aurora, Ill. Ingersoll-Rand Co., New York Star Drilling Machine Co., Akron, O.

ASPHALTS

**Colphalt Co., Cleveland

**Standard Oil Co. (Ind.), Chicago

**Standard Oil Co. (N. Y.), N. Y.

**Atlantic Ref. Co., Ine., Philadelphia
Barber Asphalt Co., Philadelphia
Guif Refning Co., Pittaburgh
Ky, Rock Asph. Co., Louisville, Ky.

Natural Rk. Asph. Corp., Owensboro, Ky.

Pioneer Asph. Co., Lawrenceville, Ill.

Sinclair Ref. Co., Chicago
Standard Oil Co. of Cal., S. Francisco
Standard Oil Co. of La., N. Orleans

Standard Oil Co. of X. J., Newark

Texas Co., N. Y.

Utah Rock Asphalt Corp., Pueblo, Colo.

Warren Bros. Co., Boston ASPHALTS

ASPHALT BLOCK Hastings Pavement Co., N. Y.

ASPHALT BRICK
Asphalt Brick Co., St. Louis

ASPHALT CUTTERS

*Sullivan Machinery Co., Chicago
*Independent Pn. Tool Co., Chicago, Ill.
*Littleford Bros., Cincinnati
Chicago Pneumatic Tool Co., N. Y.
Dayton Pneum. Tool Co., Dayton, O.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., N. Y.

ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

ASPHALT PLANTS, TOOLS, ETC.

*Chausse Oil Burner Ce., Elkhart, Ind.

*Connery & Company, Philadelphia

*F. D. Cummer & Son Co., Cleveland

*Littleford Bros., Cincinnati

Aeroil Burner Co., West New York, N. J.

American Fin-Mix Co., Chicago

American Fork & Hoe Co., Cleveland

Barber Asphalt Co., Philadelphia

Charleroi Iron Wis., Charleroi, Pa.

J. D. Farasey Mg. Co., Cleveland, O.

Hetherington & Berner, Indianapolis

Hauck Mg. Co., Brooklyn, N. Y.

Merriman Asphalt Plant, Inc., Lima, O.

Warren Bros. Co., Boston

ASPHALT POURING POTS (See Pots, Asphalt Pouring)

ASPHALT SURPACE HEATERS
*Chausse Oil Burner Co., Elkhart, Ind.
*Littleford Bros., Cinclinati
Aeroil Burner Co., West New York, N. J.
Barber Asphalt Co., Philadelphia
Equitable Asp. Maint. Co., Kan. City, Mo.
Hauck Mfg. Co., Brooklyn, N. Y.

Hauck Mfg. Co., Brooklyn, N. Y.

BACKPILLERS

*Baker Mfg. Co., Springfield, Ill.
*Bay City Shovels, Inc., Bay City, Mich.
*Buckeye Trac. Ditcher Co., Findlay, O.
*General Excavator Co., Marion, O.
*Koehring Co., Milwaukee, Wis.
*Osgood Company, Marion, O.
*Parsons Co., Newton, Is.
Austin Mach. Corp., Muskegon, Mich.
Bucyrus-Eric Co., Eric, Ps.
Byers Mach. Co., Eavenns, O.
Cieveland Trencher Co., Euclid, Ohio
Construction Machy. Co., Waterloo, Ia.
Ersted Mfg. Co., Portland, Ore.
Harnischieger Corp., Milwaukee, Wis.
LaPlant-Choste Mfg. Co., Cedar Rapids, Iowa
Link-Belt Co., Chicago
Orton Crane & Shovel Co., Chicago
Star Drilling Mach. Co., Akron, O.
Speeder Mchy. Corp., Cedar Rapids, Iowa
Waterman Corp., Detroit
Weller Mfg. Co., Chicago

BAGS

Bates Valve Bag Corp., Chicago

BAG TEUCKS
Bates Valve Bag Corp., Chicago
Case Crane & Engg. Co., Columbus, O.

BALING PRESSES Economy Baler Co., Ann Arbor, Mich.

BAR BENDERS AND CUTTERS

*Koehring Co., Milwaukee, Wis.

*Ransome Conc. Machy. Co., Dunellen, N. J.

Buffalo Forge Co., Buffalo, N. Y.

Concrete Steel Co., N. Y.

Electric Welding Co., Pittsburgh

D. A. Hinman & Co., Sandwich, Ill.

J. L. Gleason & Co., Boston, Mass.

Kardong Bros., Minneapolis

McKenna Co., Cleveland, O.

BARRICADE SUPPORTS Cleveland Steel Spec. Corp., Cleveland, O.

BAR TIES Bates Valve Bag Corp., Chicago Symons Clamp & Mfg. Co., Chicago

BATCH BOXES

*Blaw-Knox Co., Pittsburgh, Pa.

*Butier Bin Co., Waukesha, Wis.

*Erie Steel Const. Co., Erie, Pa.

*Heltzel Stl. Form & Ir. Co., Warren, O.

*Jos. Honborst Co., Cincinnati

*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati
Easton Car & Const. Co., Easton, Pa.
Easton Car & Const. Co. of Mo., Kansas C., Mo.
Fairfield Engineering Co., Marion, Ohio
Koppel Ind. Car & Equip. Co., Koppel, Pa.
Jas. B. Seaverns Co., Batavia, Ill.
Western Wheeled Scraper Co., Aurora, Ill.

BATCHERS (For Measuring Aggregates)
*Butler Bin Co., Waukesha, Wis.
*Blaw-Knox Co., Pittsburgh, Pa.
*Erie Steel Construction Ce., Erie, Pa.
*Heltzel Stl. Form & Ir. Co., Warren, O
Fairfield Engineering Co., Marion, Ohis
Superior Engineering Co., Warren, Oh

BEARINGS EARLINGS
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bear. Co., Harrison, N. J.
New Departure Mfg. Co., Eristol, Conn.
S. K. F. Industries, New York
Timken Roller Bearing Co., Canton, O.

Timken Roller Bearing Co., Canton, O.

BINS, STORAGE

*Austin-Western Rd. Mach. Co., Chicage

*Austin-Western Rd. Mach. Co., Chicage

*Austin-Western Rd. Mach. Co., Chicage

*Blaw-Knox Co., Pittsburgh, Pa.

*The Burch Corp., Crestline, Ohio

*Butler Bin Co., Wawkesha, Wis.

*Eric Steel Const. Co., Eric, Pa.

*Good Eoods Mchy. Co., Kennett Sq., Pa.

*Heltsel Stl. Form & Ir. Co., Warren, Ohio

*Industrial Brownhoist Corp., Cleveland, O.

*Ransome Conc. Machy. Co., Dunnellen, N. J.

Austin Mfg. Co., Chicago

Beaumont Mfg. Co., Philadelphia

Birmingham Tank Co., Birmingham, Ala.

Canton Art Metal Co., Canton, Ohio

C. S. Johnson Co., Champaign, Ill.

Lancaster Iron Works, Inc., Lancaster, Pa.

Link-Belt Co., Chicago

Pittzburgh-Dea Moines Stl. Co., Pittsburgh, Pa.

Jas. B. Seaverns Co., Batavia, Ill.

Superior Engineering Co., Warren, Ohio

Universal Rd. Mach. Co., Kingston, N. Y.

Weller Mfg. Co., Chicago

*LADES FOR GRADERS & SNOW PLOWS

BLADES FOR GRADERS & SNOW PLOWS
*Caterpillar Tractor Co., San Leandro, Cal.
*General Wheelbarrow Co., Cleveland
*Shunk Mfg. Co., Bucyres, Ohio
J. D. Adams Co., Indianapolis
Galion Iron Works & Mfg. Co., Galion, Ohio

BLAST HOLE DRILLING MACHINES (See Well Drilling and Blast Hole Machines)

BLASTING POWDER (See Explosives)

BLOCKS AND TACKLE

*Boston & Lockport Bik. Co., Heston, Mass.

*Dobble Pdry. & Mach. Co., Niagara Falls, N.Y.

*Western Block Co., Lockport, N. Y.

*Chause oil Burner Co., Elkhart, Ind.

*Littleford Bros., Cincinnati

*G. H. Williams Co., Erie, Pa.

Everhot Mfg. Co., Maywood, Ill.

Hauck Mfg. Co., Brooklyn, N. Y.

BLUE PRINT MACHINES Paragon Revolute Corp'n, Rochester, N. Y. C. F. Pease Co., Chicago Wickes Bros., Saginaw, Mich.

BOILERS **Sollers**

*Johnston Bros., Inc., Perrysburg, Mich.

*Manitowoc Eng'g Wks., Manitowoc, Wis.
Babcock & Wilcox Co., New York
Chandler & Taylor Co., Indianapolis
Chatta. Boiler & Tank Co., Chatta., Tenn.
R. D. Cole Mig. Co., Newna, Ga.
Eric City Iron Works, Eric, Pa.



For Directory of Local Distributors of Contractors' Equipment, See Pages 197-224



. . W H E R E T O P U R C H A S E . . .

BOILERS (Continued)

OILERS (Continued)

Hartley Bir. Works, Montgomery, Ala.
Int'l. Comb. Eng. Corp., Chattanooga, Tenn.
Heine Boiler Co., St. Louis, Mo.
E. Keeler Co., Williamsport, Pa.
Jas. Leffel & Go., Springfield, Ohio
Burnham Boiler Corp., Irvington, N. Y.
Murray Iron Works Co., Burlington, Iowa
Nagle Eng. & Bir. Works, Eric, Pa.
New Bern Iron Works & Sup. Co., New Bern,
N. C.
Orr & Sembower, Reading, Pa.
Petroleum Iron Works Co., Sharon, Pa.
J. S. Schofield's Sons Co., Macon, Ga.
Stanwood Corp., Cincinnati, Ohio
Superior Body Corp., Marion. Ind.
Vogt Mchy. Co., Inc., Louisville, Ky.

BRACES, TRENCH

*Templeton, Kenly & Co., Chicago
Jas H. Channon Mfg. Co., Chicago
Duff-Norton Mfg. Co., Pittsburgh, Pa.
Kalamazoo Fdry. & Mach. Co., Kalamazoo, Mich.

BRANDING TOOLS *Everhot Mfg. Co., Maywood, Ill.

BRASS GOODS

HASE GOODS

Glauber Brass. Mig. Co., Cleveland, Ohio Haydenville Co., Haydenville, Mass. Hays Mig. Co., Erie, Pa.

Mueller Company, Decatur, Ill.
Union Water Meter Co., Worcester, Mass. United-Obendorf Corp., Cleveland, Ohio

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BREAKERS, CONCRETE

*McKiernan-Terry Corp., New York
*Independent Pn. Tool Co., Chicago

*Sullivan Machy. Co., Chicago

*Sullivan Machy. Co., Chicago

Chicago Pneumatic Tool Co., Cleveland
Cleveland Pneumatic Tool Co., Cleveland

Gardner-Denver Co., Quincy, Ill.

Gliman Mig. Co., E. Boston, Mass.

Hardsocg Wonder Drill Co., Ottumwa, Iowa
Ingersoll-Rand Co., New York

Milwaukee Gas Tool Co., Milwaukee

Rapid Concrete Breaker Co., Los Angeles, Cal.

BRICK, PAVING (See Paving Brick)

BRIDGE FLOORS

*Armco Culvert Mfrs. Assn., Middletown, O. American Bridge Co., N. Y. W. R. Meadows, Inc., Elgin, Ill.

BRIDGES AND BUILDINGS, STEEL

**Baker Mfg. Co., Springheid, Missouri Vy. Br. & Ir. Co., Leavenworth, Kas. Mt. Vernon Br. Co., Mt. Vernon, Ohio Bellefontaine Br. & Stl. Co., Bellefontaine, O. Bethlehem Steel Co., Bethlehem, Ps. Butler Mfg. Co., Minneapolis, Minn. Central States Br. Co., Indianapolis, Ind. Champion Bridge Co., Wilnington, Ohio Cheaspeake Iron Works, Baltimore, Md. Clinton Bridge Co., Wirneapolis Fort Pitt Br. Works, Blitmore, Md. Clinton Bridge Co., Winneapolis Fort Pitt Br. Works, Pittsburgh, Ps. Ingalls Iron Works Co., Birmingham, Ala. Inter. Steel & Iron Co., Kimneapolis Fort Pitt Br. Works, Pittsburgh, Ps. Ingalls Iron Works Co., Bransville, Ind. Lakeside Br. & St. Co., No. Milwaukee Louisville Br. & Iron Co., Louisville, Ky. McClintie Marshall Co., Pittsburgh, Ps. Milwaukee Br. Co., Milwaukee, Wis. Minneapolis-Moline Power Impl. Co., Minneapolis-Moline Pow apolis
Penn Bridge Co., Beaver Falls, Pa.
Pittsburgh-Des Moines Stl. Co., Pittsburgh,
Pa.
Richmond Struc. Stl. Co., Richmond, Va.
Riverside Br. Co., Martins Ferry, Ohio
Virginia Br. & Ir. Co., Roanoke, Va.
Wisc. Br. & Ir. Co., No. Milwaukee,
Vogt. Mchy. Co., inc., Louisville, Ky. apolis

BROOMS (See Street Sweeping Brooms)

BUCKETS, AUTOMATIC DUMPING

*Lakewood Eng. Co., Cleveland, O. *Union Iron Wks., Inc., Hoboken, N. J. G. L. Steubner Ir. Wks., Inc., L. I. City, N. Y.

BUCKETS, CLAM SHELL

**Blaw-Knex Co., Pittsburgh, Pa.

*Erie Steel Const. Co., Erie, Pa.

*Hayward Co., N. Y.

*Industrial Brownhoist Corp., Cleveland

*Lakewood Eng. Co., Cleveland, Ohio

*Manitowec Eng'g. Wis., Manitowec, Wis.

*G. H. Williams Co., Erie, Pa.

Browning Crane Co., Cleveland, Ohio

Geo. Haiss Mig. Co., New York

J. F. Kiesler Co., Chicago

Link-Belt Co., Chicago McMyler Interstate Co., Cleveland, Ohio Mead-Morrison Mfg. Co., E. Boston, Mass. Orton Crane & Shovel Co., Chicago Owen Bucket Co., Cleveland, Ohio Page Eng. Co., Chicago

BUCKETS CONCRETE

**Subsect of the Control of the Cont

BUCKETS, DRAGLINE

**Blaw-Knox Co., Pittsburgh, Pa.

**Dobbie Fdry. & Mach. Co., Niagara Falis, N.Y.

**Hayward Co., New York

*Sauerman Bros., Chicago

**Schofeld-Burkett Constr. Co., Macen, Ga.

**G. H. Williams Co., Erie, Pa.

Beaumont Mfg. Co., Philadelphia

Harnischfeger Corp., Milwaukee

Link-Belt Co., Chicago

Monighan Mach. Co., Chicago

BUCKETS, DREDGING AND EXCAVATING BUCKETS, DREDGING AND EXCAVATING

*Blaw-Knox Co., Pittsburgh, Pa.

*Hayward Co., N. Y.

*Industrial Brownhoist Corp., Cleveland

*Lakewood Eng. Co., Cleveland, Ohio

*Manitowoc Eng'g. Wks., Manitowoc, Wis.

*G. H. Williams Co., Eric, Pa.

Browning Crane Co., Cleveland

Geo. Haiss Mfg. Co., New York

J. F. Kiesler Co., Chicago

Link-Belt Co., Chicago

Mead-Morrison Mfg. Co., E. Boston, Mass.

Orton Crane & Shovel Co., Chicago

Owen Bucket Co., Cleveland, Ohio

BUCKETS, ORANGE PEEL

*Hayward Co., M. Y.
Industrial Works, Bay City, Mich.
J. F. Kiesler Co., Chicago
McMyler Interstate Co., Cleveland, Ohio
Mead-Morrison Mfg. Co., E. Boston, Mass.,
Orton Crane & Shovel Co., Chicago

BUILDING FORMS (See Forms, Conc.)

BUILDINGS, STEEL (See Bridges)

BULLDOZERS *Baker Mfg. Co., Springfield, III.
*Trackson Co., Milwaukee, Wis.
LaPlant-Choate Mfg. Co., Cedar Rapide, Iowa
Miami Trailer-Scraper Co., Troy, Ohio

Pt. Pitt Bedding Co., Pittsburgh, Pa. Haggard & Marcusson Co., Chicago Southern Rome Co., Baltimore, Md.

OBLEWAYS, DRAGLINE

*8. Flory Mfg. Co., Bangor, Pa.

*McKiernan-Terry Corp., New York

*Sancerman Bros., Chicago

Schoffeld-Burkett Constr. Co., Macon, Ga.

Beaumont Mfg. Co., Philadelphia

L. P. Green, Chicago

Link-Belt Co., Chicago

Mead-Morrison Mfg. Co., E. Boston, Mass.

Street Bros. Mach. Works, Chattanooga

CARS FOR MOTOR TRUCKS

Highland Body Mfg. Co., Cincinnati, Ohio Weatherproof Body Corp., Corunna, Mich.

AISSONS
American Bridge Co., N. Y.
Biggs Boller Works, Akron, Ohio
Birmingham Tank Co., Birmingham,
Bethlehem Steel Co., Bethlehem, Pa
Petroleum Ir. Wks. Co., Sharon, Pa.

CALCIUM CHLORIDE FOR ROADS *Columbia Products Co., Barberton, O. *Dow Chemical Co., Midland, Mich. *Solvay Sales Corp., New York

CANS FOR GARBAGE AND REPUSE

American Can Co., N. Y.
Durlach Can & Iron Wks., Brooklyn, N. Y.
Rochester Can Co., Rochester, N. Y.
Solar-Sturges Mfg. Co., Melrose Pk., Ill.
Witt Cornice Co., Clincinnati, Ohio

CAR UNLOADERS (See Loaders)

CARS, INDUSTRIAL V. DUMPING CARS, INDUSTRIAL V. DUMPING
*Insley Mfg. Co., Indianapolis, Ind.
*Clakewood Eng. Co., Cleveland, Ohio
Atlas Car & Mfg. Co., Cleveland, Ohio
Austin Mfg. Co., Ohicago
Case Crane & Engg. Co., Columbus, O.
Chase Fdry. & Mfg. Co., Columbus, O.
Chase Fdry. & Mfg. Co., Easton, Pa.
C. W. Hunt Co., W. New Brighton, N. Y.
Koppel Ind., Car & Equip. Co., Koppell, Pa.
G. L. Steubner Ir. Wks., Inc., L. I. City, N. Y.
United Ir. Wks., Inc., Lansar City, Mo.
Weller Mfg. Co., Chicago
Whiting Corp., Harvey, Ill.

ARTS, CONCRETE

*General Wheelbarrow Co., Cleveland, Ohio
*Insiey Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, Ohio
*Lakewood Eng. Co., Cleveland, Ohio
*Lansing Co., Lansing, Mich.
*Ransome Conc. Mchy. Co., Dunellen, N. J.
Acme Rd. Machy. Co., Prankfort, N. Y.
Case Crane & Eng. Co., Columbus, O.
Chattanooga Wheelbarrow Co., Cleveland; Ohio
Easton Car & Const. Co., Easton, Pa.
Gray Iron Fdry. Co., Raading, Pa.
Jackson Mfg. Co., Harrisburg, Pa.
Lee Trailer & Body Co., Plymouth, Ind.
Sterling Wheelbarrow Co., Milwaukee
Toledo Wheelbarrow Co., Toledo, Ohio

CAST IRON PIPE (See Pipe, Cast Iron)

CASTINGS, STEEL

*Brown Clutch Co., Sandusky, Ohio Farrell-Cheek Steel Fdry. Co., Sandusky, Ohio Wheeling Mold & Fdry. Co., Wheeling, W. Va.

CASTINGS, STREET AND SEWER CASTINGS, STREET AND SEWER

*Central Fdry. Co., N. Y.

*U. S. Pipe & Fdry. Co., Burlington, N. J.
Canton Fdry. & Mach. Co., Canton, Ohio
H. W. Clark Co., Mattoon, Ill.
Clarksville Fdry. & Mach. Co., Clarksville, Tenn.
J. B. Clow & Sons, Chicago
Donley Bros. Co., Clevoland
Eikhart Fdry. & Mach. Co., Elkhart, Ind.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Int'l. Comb. Eng. Co., Aberdeen, S. Dak.
Klauer Mfg. Co., Dubuque, Iowa
Madison Fdry. Co., Cleveland, Ohio
Niles Machine Co., Lebanon, N. H.
Pechstein Iron Works, Keokuk, Iowa
Sessions Foundry Co., Bristol, Conn.
South Bend Fdry. Co., So. Bend, Ind.

CATCH BASINS (See Castings, Street)

CATCH BASIN CLEANING OUTFITS Atia Sales Corp., New York Elgin Sales Corp., N. Y. Mack Trucks, Inc., N. Y.

CAULKING MACHINERY AND TOOLS

*Independent Pn. Tool Co., Chicago Helwig Mfg. Co., St. Paul, Minn. Ingersoll-Rand Co., New York Mueller Company, Decatur, Ill.

Ingersoll-Rand Co., New York
Mueiler Company, Decatur, Ill.

CEMENT—(P. C. stands for Portland Cement)

*Columbia Cem. Div. of Pittsburgh Plate Glass
Co., Pittsburgh
Universal Portland Cement Co., Chicago
Acme Cement Corp., Catskill, N. Y.

Ætna P. C. Co., Detroit, Mich.
Allentown P. C. Co., Catasauqua, Pa.

Alpha P. C. Co., Easton, Pa.

Ash Grove Lime & P. C. Co., Kansas City, Mo.

Atlas P. C. Co., N. Y.

Beaver P. C. Co., Portland, Ore.

Bessemer Limestone & C. Co., Youngstown, O.

British Col. Cement Co., Victoria, B. C.
Canada Cement Co., Ltd., Montreal, Canada
Colorado P. C. Co., Denver, Colo.
Consolidated Cement Corp., Chicago
Cowell P. C. Co., Cowell, Cal.

Crescent P. C. Co., Cwall, Cal.

Crescent P. C. Co., Canada City, Mo.

Diamond P. C. Co., Caleveland, Ohio

Edison P. C. Co., N. Y.

Georgia Cement & Stone Co., Birmingham, Ala.

Giant P. Q. Co., Philadelphia, Pa.

Glens Falls P. O. Co., Glens Falls, N. Y.

Golden State P. C. Co., Los Angeles, Cal.

Great West'n. P. C. Co., Los Angeles, Cal.

Great West'n. P. C. Co., Los Angeles, Cal.

Hawkeys P. C. Co., Detroit, Mich.

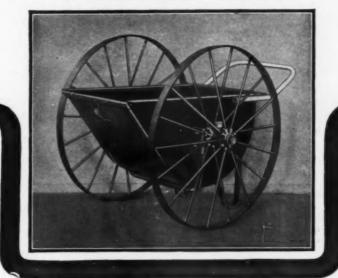
International Cement Corp., N. Y.

International Compania de Cemento Portland,

Mexico City, Mex.

If you find any errors or omissions in this Where to Purchase list, please send corrections to Contractors and Engineers Monthly

See this Cart and Our Exhibit of Empire Grader Blades at the Road Show, Booth 614





This steel bushing is renewable. It takes all the wear. You may have to replace the bushing, but the axle will never wear out.

The all-around strength of the General Concrete Cart is illustrated by its ackt, which is guaranted unconditionally against breaking or bending. It is made of alloy sited, beat treated and temper drawn to a tremendous degree of toughness. It can teven wear, because of General's renewable steel bushing, a feature to be found on me ather concrete buggs.

Mr. Contractor, You Need This Concrete Cart

As the costs of construction work mount, no contractor can afford to pamper less-than-100% equipment. You are losing money if your materials handling is anything short of top-notch.

A concrete cart demands your attention if it handles more concrete and does it faster. If it further promises indefinitely long life, due to an axle that can't break or even wear, as well as other year-ahead features,—well, Mr. Contractor, you just naturally need this concrete cart.

The 1929 General Concrete Cart has these advantages—and others. Let us give you the full story, together with the name of your nearest distributor.

GENERAL WHEELBARROW COMPANY

Associated Companies:

General Wheelbarrow Company The Empire Plow Company

Headquarters for Wheelbarrows, Concrete Carts, Steel Mortar Boxes, Salamanders, Coal Chutes, Agricultural Implements, Plow Shapes, Scrapers, Road Grader Blades.

3140 East 65th Street

Cleveland, Ohio

Empire Road Grader Blades

The same specialized strength runs through all General Contractors Equipment and General Highway Equipment. Empire Road Crader Blades, now sold through General distributors, are made of a new special steel which has all the resistance to abrasion of plow steel. They are accurately curved to cut clean and hold their edge. Write for full details.



See this Cart and Our Exhibit of Empire Grader Blades at the Road Show, Booth 614 DEMENT (Continued)

Lawrence Cement Co., New York

Lehigh P. C. Co., Allentown, Pa.

Louisville Cement Co., Louisville, Ky.

Manitowoc P. C. Co., Manitowoc, Wis.

Marlboro Cement Co., Edonaton, Can.

Marquette Cement Mg. Co., Chicago

Missouri P. C. Co., St. Louis, Mo.

Monarch Cement Co., Edonaton, Can.

Monolith P. C. Co., Los Angeles, Cal.

National Cement Co., Birmingham, Ala.

Nasareth Cement Co., Nasareth, Pa.

Nebrasks Cement Co., Newago, Mich.

New Egyptian P. C. Co., Detroit

North Amer. Cement Corp., Albany, N. Y.

Northwestern States P. C. Co., Mason City, Ia.

Oklahosna P. C. Co., Lot, Seattle

Oregon P. C. Co., Detroit, Mich.

Peninsular P. C. Co., Detroit, Mich.

Peninsular P. C. Co., Content City, Mich.

Penn-Allen Cement Co., Nasareth, Pa.

Pennsylvania-Dixic Cemant Corp., M. Y.

Petoskey P. C. Co., Priladelphia

P. C. Co. of Utah, Salt Lake City

Pyramid P. C. Co., Lot Angeles

St. Marys Cement Co., Toronto, Can.

San Antonio P. C. Co., Los Angeles

St. Marys Cement Co., Toronto, Can.

San Antonio P. C. Co., San Antonio

Santa Crus P. C. Co., San Antonio

Santa Crus P. C. Co., San Antonio

Santa Crus P. C. Co., San Strancisco

Signal Mountain P. C. Co., Bockport, Ga.

Southwestern P. O. Co., Battimore, Md.

Trinity P. C. Co., Detroit

Man P. C. Co., Detroit, Mah.

Three Forks P. C. Co., Beatwie, Wash.

Three Forks P. C. Co., Bockport, Ga.

Southwestern P. O. Co., Battimore, Md.

Trinity P. C. Co., Dallas, Tex.

Union P. C. Co., Dallas, Tex.

Union

CEMENT BLOCK MACHINES
Abrams Cement Tool Co., Detroit, Mich.
Cement Block Machy. Co., Newark, N. J.
J. B. Foote Fdry. Co., Fredericktown, O.
Zagelmeyer Cast Stone Block Machy. Co., Bay

CEMENT SPRAYERS OR GUNS Cement-Gun Co., Allentown, Pa. Macleod Co., Cincinnati

CENTRIFUGAL PUMPS (See Pumps, Centrif-

Allos Amer. Chain Co., Inc., Bridgeport, Conn. Baldwin Chain & Mig. Co., Worcester, Mass. Chain Belt Co., Milwaukee, Wis. Columbus McKinnon Chain Corp., Tonawands. N. Y.
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Jeffrey Mfg. Co., Columbus, Ohio
Link-Belt Co., Chicago
U. S. Chain & Forge Co., Pittsburgh, Ps.
Webster Mfg. Co., Chicago
Weller Mfg. Co., Chicago

Weller Mfg. Co., Chicago

CHIMNEYS, CONCRETE Heine Chimney Co., Chicago H. R. Heinicke, Inc., Indianapolis, Ind. Rust Engineering Co., Pittsburgh, Pa. Weber Chimney Co., Chicago

CHIMNEYS, RADIAL BRICK
Amer. Chimney Corp., N. Y.
Continental Chimney Co. of Chicago, Chicago
Alphons Custodis Chimney Const. Co., N. Y.
Heine Chimney Co., Chicago
H. R. Heinicke, Inc., Indianapolis, Ind.
M. W. Kellogg & Co., N. Y.
Rust Engineering Co., Pittsburgh, Pa.

CHIMNEYS, STEEL (See Stacks, Steel)

Chisels, Chipping
Cleveland Steel Tool Co., Cleveland, Ohio

CHLORINATORS Wallace & Tiernan Co., Inc., Newark, N. J. Paradon Mfg. Co., Arlington, N. J. CHLORINE, LIQUID
(See Liquid Chlorine)

CHUTES, CONCRETE

*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, Ohio
*Ransome Conc. Mchy. Co., Dunellen, M. J.
Archer Iron Works, Chicago

CLAMPS & TIES, FORM

*Insiey Mfg. Co., Indianapolis
American Form-Hold Corp., Culver City, Cal.
Batavia Clamp Co., Inc., Batavia, N. Y.
Black Bros. Co., Mendota, Ill.
Concrete Form Tie Corp., Pittsburgh, Pa.
Ezy-Set Wall Tie Co., Dayton, O.
W. A. Kuhlman & Co., Toledo
M. & Wire Clamp Co., Minneapolis
James L. Taylor Mfg. Co., Poughkeepsie, N.Y.
Universal Form Clamp Co., Chicago
Wedgit Tie Co., Inc., New York

Wedgit Tie Co., Inc., New York

CLAMPS, COLUMN

"Ellis & Ford Mfg. Co., Detroit, Mich.

"Insley Mfg. Co., Indianapolis, Ind.
Black Bros. Co., Mendota, Ill.
Concrete Eng. Co., Omaha, Neb.
Handy Mfg. Co., Chicago
Kardong Bros., Inc., Minneapolis
W. A. Kuhiman & Co., Toledo, Ohio
M. & M. Wire Clamp Co., Minneapolis
The O. D. G. Co., Owensboro, Ky.
J. E. Porter Corp., Ottawa, Ill.
H. W. Roos Co., Cincinnati
Steelform Contracting Co., San Francisco
Sterling Wheelbarrow Co., Milwaukee
Symons Clamp & Mfg. Co., Chicago
James L. Taylor Mfg. Co., Coughkeepsie, N. Y.
Universal Form Clamp Co., Chicago
Wedgit Tie Co., Inc., New York

CLAY DIGGERS, PNEUMATIC BLAY DIGGERS, PNEUMATIC
Buckeys Traction Ditcher Co., Pindlay, O.
Budependent Pn. Teel Co., Chicage
Sullivan Machy. Co., Chicage
Chicago Pneumatic Tool Co., New York
Cleveland Rock Drill Co., Cleveland
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., New York

CLAY PIPE (See Pipe, Vitrified Clay)

CLIPS, WIRE BOPE

*Amer. Steel & Wire Co., Chicago
Amer. Hoist & Derrick Co., St. Paul, Minn.
Fischer & Hayes Rope & Steel Co., Chicago
Hazard Wire Rope Co., Wilkes Barre, Pa.,
Thos. Laughlin Co., Portland, Me.,
Marion Malleable Iron Works, Marion, Ind.
C. M. Mockbee & Co., Cincinnati, Chio
John A. Roebling Sons Co., Trenton, J.
Upson-Walton Co., Cleveland, Ohio

Macleod Co., Cincinnati

CEMENT INSPECTION (See Inspecting Laboratories)

CEMENT TOOLS
Abrams Cement Tool Co., Detroit
American Fork & Hoe Co., Cleveland

CEMENT TOOLS
Abrams Cement Tool Co., Detroit
American Fork & Hoe Co., Cleveland

COCKS, CURB AND CORPORATION Chapman Valve Mfg. Co., Indian Orch'd, Mass. Glauber Brass Mfg. Co., Cleveland, Ohio Haydenville Co., Haydenville, Mass. Hays Mfg. Co., Erie, Pa. Mueller Co., Decatur, Ill. Union Water Meter Co., Worcester, Mass.

CONCRETE BLOCK MACHINES (See Cement Block Machines)

CONCRETE CURING

*Columbia Prod. Co., Barberten, O.

*Dow Chemical Co., Midland, Mich.

*McEverlast, Inc., Los Angeles, Calif.

*Solvay Sales Corp., New York

Barber Asphalt Co., Philadelphia

CONCRETE HEATERS

*Chausse Oil Burner Co., Elkhart, Ind.

*Connery & Co., Philadelphia, Pa*Littleford Bres., Clincinnati
Aeroil Burner Co., West New York, N. J.,
Hauck Mfg. Co., Brooklya, N. Y.,
Alex. Milburn Co., Baltimore, Md.

CONCRETE MIXERS

*Atlas Engineering Co., Clintonville, Wis.

*Jaseger Mach. Co., Columbus, Ohio

*Keehring Co., Milwaukee, Wis.

*Lakewood Eng. Co., Cleveland, Ohio

*Lansing Co., Lansing, Mich.

*John Lauson Mfg. Co., New Holstein, Wis

*Eansome Con. Mchy. Co., Dunellen, N. J.

*Espublic Iron Wis., Tecumseh, Mich.

*T. L. Smith Co., Milwaukee

Acme Rd. Machy. Co., Frankfort, N. Y.
Amer. Cem. Mchy. Co., Inc., Keokuk, Iowa
Anchor Mfg. Co., Chicago
Archer Iron Worke, Chicago
Badger Con. Mixer Co., Milwaukee
Chain Belt Co., Milwaukee
Construction Mchy. Co.. Waterloo, Iowa
Norris K. Davis, San Francisco, Calif.
J. B. Foote Fdry. Co.. Fredericktown, Ohio
Gray Iron Fdry. Co., Centerville, Iowa
Knickerbocker Co., Jackson, Mich.
Kwik-Mix Concrete Mixer Co., Port Washington, Wis.
Leach Co., Oshkosh, Wis.
Orr & Sembower, Reading, Pa.
Remmel Mfg. Co., Kewaskum, Wis.

CONCRETE PAVERS (See Pavers, Concrete) CONCRETE PILING (See Piling) CONCRETE PIPE (See Pipe, Concrete)

CONCRETE PLACERS, PNEUMATIC

*Ransome Concrete Machy. Co., Dunnellen, N. J.

Cement-Gun Co., Inc., Allentown, Pa.

Macleod Co., Cincinnati

Macleod Co., Cincinnati

CONCRETE REINFORCEMENT

*American Steel & Wire Co., Chicago

*Truscon Steel Co., Youngstown, Ohio

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittaburgh, Pa.
Concrete Steel Co., N. Y.
Consolidated Exp. Metal Co., Wheeling, W. Vu.
Electric Welding Co., Pittaburgh, Pa.
Ft. Pitt Bridge Works, Pittaburgh, Pa.
Genfire Steel Co., Chicago
Kalman Steel Co., Chicago
Kalman Steel Co., Chicago
Laclede Steel Co., St. Louis, Mo.
National Steel Fabric Co., Pittaburgh
Republic Iron & Steel Co., Youngstown, Ohio
J. T. Ryerson & Son, Chicago
Wickwire-Spencer Steel Co., N. Y.
Youngstown Pressed Steel Co., Warren, Ohio
CONCRETE BOAD PINISHERS

CONCRETE ROAD FINISHERS

*Blaw-Knox Co., Pittsburgh, Pa.

*A. W. French & Co., Chicago

*Helksel Steel Form & Iron Co., Warren, Ohie

*Lakewood Eng. Co., Cleveland, Ohio

CONDENSERS Allis-Chalmers Mfg. Co., Milwaukee Ingersoll-Rand Co., N. Y. Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

Wheeler Cond. & Eng. Co., Carteret, N. J.
Worthington Pump & Machy. Corp., N. Y.

CONDUIT RODS
Turbine Sewer Mch. Co., Milwaukee
Waldo Bros. & Bond Co., Boston
Westinghouse Elec. Sup. Co., F. Bissell Div.
Toledo.

CONDUITS, UNDERGROUND Amer. Vitr. Products Co., Akron, Ohio Johns-Manville, Inc., N. Y. National Fireproofing Co., N. Y. Ponsacola Creosoting Co., Pensacola, Pla. Ric-will Co., Cleveland

CONTRACTORS' EQUIPMENT DEALERS (See

CONTRACTORS' EQUIPMENT DEALERS (See Pages 197-224.

CONVEYORS, BELT

*Atias Engineering Co., Clintonville, Wis.
*Austin. Western Rd. Mchy. Co., Chicago
*Barber-Greene Co., Aurora, Ill.
*The Burch Corp., Crestline, Ohio
*Chicago Automatic Conv. Co., Chicago
*Conveying Weigher Co., New York
*Good Rds. Mchy. Co., Kennett Sq., Pa*Jos. Honhorst Co., Cincinnati
*Industrial Brownhoist Cerp., Cleveland
Austin Mfg. Co., Chicago
C. O. Bartlett & Snow Co., Cleveland
Chain Belt Co., Milwaukoe, Wis.
Cincinnati Rubber Mfg. Co., Cincinnati
Cyclone Fence Co., Wankegan, Ill.
Fairfield Engineering Co., Marion, Ohio
Galion Iron Works & Mfg. Co., Galion, Ohio
Gifford-Wood Co., Hudson, N. Y.
Geo. Haiss Mfg. Co., New York
Jeffrey Mfg. Co., Columbus, Ohio
Lamson Co., Syracuse, N. Y.
Link-Belt Co., Chicago
New Holland Mach. Co., Janesville, Wis.
Samuel Olson & Co., Chicago
Portable Machinery Co., Clifton, N. J.
Robins Conv. Belt. Co., N. Y.
Jas. B, Seaverns Co., Batavia, Ill.
Smith Eng. Wks., Milwaukee
Standard Conv. Oc., Oc., Cheapo
Webster Mfg. Co., Chicago
Weller Mfg. Co., Chicago
Weller Mfg. Co., Chicago

If you find any errors or omissions in this Where to Purchase list, please send corrections to Contractors and Engineers Monthly

ANNOUNCING New 1930 Models



The Low Priced Quality Line

New Sizes—New Designs—New Improvements Faster Mix—Quicker Discharge—Easier Operation

A COMPLETE LINE

3-3½-5-7-10-14 Foot Sizes

Republic Mixers can be had in a wide range of sizes in both tilting and non-tilting types of drum with wheelbarrow hopper or power loader, water tanks, chutes, pumps, hoists, batch meters, steel or rubber tires, etc.



What Users Want REPUBLIC Mixers Have

The New Republic Mixers have everything — faster mix, quicker discharge, easier operation, simplified design, sturdier construction, one-man control, easier running drums, lower center of gravity, automatic stop, steeper elevating skips, and many other advantages.

They represent the B-E-S-T in mixer construction.

SEND FOR CATALOGS AND PRICES

Do not fail to send for a copy of catalogs showing these late models. Republic Dealers carry complete stocks for prompt delivery and will gladly demonstrate them. Don't buy before you see the New Republic Models. The prices will be a surprise.

DEALERS ATTENTION

A few valuable territories are open. Contractors like these new machines while the prices appeal to the purse. Get in on this paying line while still open.

H. BREWER & CO. OWNERS REPUBLIC IRON WORKS
Tecumseh, Mich.



Concrete Mixers Concrete Mixers

-- WHERE TO PURCHASE --

CONVEYORS, BUCKET

*Atlas Engineering Co., Clintonville, Wis. *Ohicago Automatic Conv. Co., Chicago Co., N. Y. Good Ecada Machy. Co., Kennett Sq., Pa. *Jos. Honhorst Co., Chicanati, Ohic Industrial Brownhoist Corp., Cleveland Austin Mg. Co., Chicago C. O. Bartlett & Snow Co., Cleveland, Ohic H. W. Caldwell & Son, Chicago Chain Belt Co., Milwaukee, Wis. Fairfield Engineering Co., Marion, Ohic Gifford-Wood Co., Hudson, N. Y. Goodfrey Oonv. Co., Elkhart, Ind. Guarantee Constn. Co., N. Y. Goo. Hais Mfg. Co., New York Jeffrey Mfg. Co., Columbus, Ohic Lamson Co., Syracuse, N. Y. Link-Belt Co., Chicago Mead-Morrison Mfg. Co., E. Boston, Mass. New Holland Mach. Co., N. Holland, Pa. Samuel Olson & Co., Chicago Mead-Morrison Mfg. Co., Congatown, Ohic Robins Conv. Belt Co., N. Y. Jas. B. Sawerns Co., Statavia, Ill. Stephans Adamson Mfg. Co., Aurora, Ill. Universal Crusher Co., Codar Rapids, Iowa Webster Mfg. Co., Chicago

CONVEYORS, GRAVITY
Lamson Co., Syracuse, N. Y.
Logan Co., Louisville, Ky.
Mathews Conveyor Co., Elwood City, Pa.
Standard Conv. Co., No. St. Paul, Minn.

**COUPLINGS, HOSE, AIR AND WATER

**C. B. Hunt & Son, Salem, O.

*Independent Pneumatic Tool Co., Chicage Cleveland Pneum. Tool Co., Cleveland, O., Gliman Mfg. Co., East Boston, Mass. Ingersoll-Rand Co., N. Y.

W. H. Keller, Inc., Grand Haven, Mich. Mulconroy Co., Philadelphia

Mulconroy Co., Philadelphia

CRANES, CRAWLER

*Bay City Shovels, Inc., Bay City, Mich.

*Buckeys Traction Ditcher Co., Pindlay, C.

General Excavator Co., Marion, Ohio

*Industrial Brownhoist Corp., Cieveland

*Manitowoc Engr. Works, Manitowec, Wis.

*Osgood Company, Marion, Ohio

*Thackson Co., Milwaukee

*Universal Crane Co., Lorain, Ohio

*Browning Crane Co., Lorain, Ohio

Browning Crane Co., Eleveland

Bucyrus-Eric Co., Erie, Pa.

Byors Mach. Co., Ravenna, O.

Link-Belt Co., Chicago

McMyler Interstate Co., Cleveland

Mead-Morrison Mg. Co., E. Boston

Northwest Eng. Wks., Chicago

Ohio Loc. Crane Co., Bucyrus, Ohio

Ohio Power Shovel Co., Links, O.,

Orton Crane & Shovel Co., Chicago

Star Drilling Mach. Co., Akron. Ohio

CRANES, LOCOMOTIVE

Star Drilling Mach. Co., Akron. Ohio
CRANES, LOCOMOTIVE
*Industrial Brownhoist Corp., Cleveland
*Keehring Co., Milwaukee
*Ongoed Company, Marlen, Ohio
*Parsons Co., Newton, Lowa
*Thew Shovel Co., Lorain, Ohio
Amer. Hat. & Derrick Co., St. Paul, Minn.
Browning Crane Co., Cleveland, Ohio
Bucyrua-Eric Co., Eric, Pa.
Link-Belt Co., Chicago
Loc. Crane Co. of Amer., Champaign. Ill.
McMyler Interstate Co., Cleveland, Ohio
Northwest Eng. Works, Chicago
Ohio Loc. Crane Co., Bucyrus, Ohio
Orton Crane & Shovel Co., Chicago
Jas. B. Seaverns Co., Batavia. Ill.
Speeder Mchy. Corp., Cedar Rapids, Iowa
U. S. Crane Co., Chicago

CRANES, ONE-TON
*Hughes-Keenan Co., Mansfield, Ohio
Clark Tructractor Co., Battle Creek, Mich.
Otis Eng. Co., New York
Sterling Tractor Equipment Co., New York
Whitehead & Kales Co., Detroit, Mich.

CRANES, OVERHEAD TRAVELING

*Erie Steel Const'n. Co., Erie, Pa.
Alliance Mach. Co., Alliance, O.
Chesapeake Iron Wks., Baltimore, Md.
Chisholm-Moore Mg. Co., Cleveland
Curtis Pn. Mchy. Co., St. Louis
Harnischfeger Corp., Milwakee, Wis.
Milwaukee Elec. Crane Co., Milwaukee
Morgan Eng. Co., Alliance, O.
Northern. Eng. Wks., Detroit, Mich.
Shaw Crane Wks., Munkegon, Mich.
Shepard Elec. Cr. & Hat. Co., Montour Falls,
N. Y.
Toledo Crane Co., Busyang, C. Toledo Crane Co., Bucyrus, O. Whiting Corp., Harvey, Ill.

CRANES, TRUCK

*Universal Crane Co., Lorain, Ohio
Atia Sales Corp., New York
Bay City Fdry. & Mach. Co., Bay City, Mich.
Browning Crane Co., Cleveland
Ersted Mfg. Co., Portland, Ore.
Harnischfeger Corp., Milwankee, Wis.
Orton Crane & Shovel Co., Chicago

CRANES, WEECKING
*Industrial Brownhoist Corp., Cleveland
Bucyrus-Erie Co., Erie, Pa.
Industrial Wks., Bay City, Mich.

CRAWLEE ATTACHMENTS
*Trackson Co., Milwaukee, Wis.
Belle City Mig. Co., Racine, Wis.
Geo. Haiss Mig. Co., New York
Link-Belt Co., Chicago

CRESOTED BLOCKS, TIMBER, ETC.

Amer. Creos. Co., Inc., Louisville, Ky.
Amer. Creos. Co., Inc., Louisville, Ky.
Amer. Creos. Wks., Inc., New Orleans, La.
Ayer & Lord Tie Co., Chicago
Carter Bloxonend Flooring Co., K. City, Mo.
Colonial Cre. Co., Inc., Louisville, Ky.
Compressed Wood Preserv. Co., Cincinnati, O.
Creos. Materials Co., New Orleans, Ls.
Georgis Creos. Co., Louisville, Ky.
Jennison-Wright Co., Toledo, O
Long Bell Lumber Co., Kansas City, Mo.
Midland Creos. Co., Granite City, Ill.
Pensacola Cresoting Co., Pensacola, Fla.
Republic Creos. Co., Indianapolis, Ind.
Southern Wood Pres. Co., Atlanta, Gs.
Wyckoff Pipe & Creos. Co., N. Y.

BUSHERS, ROCK

*Alkis-Chalmers Mfg. Co., Springfield, Ill.

*Austin-Western Rd. Mach. Co., Chicage

*Good Rds, Machy. Co., Kennett Sq., Pa.
Acme Rd. Machy. Co., Frankfort, N. Y.
Austin Mfg. Co., Chicago

Galion Ir. Wks. & Mfg. Co., Galion, O.
New Eng. Road Machy. Co., So. Boston, Mass.
New Holland Mach. Co., New Holland, Pa.
Rusaell Grader Mfg. Co., Minneapolis

Smith Eng. Wks., Milwaukee
Sturtevant Mill Cor., Boston
Universal Crusher Co., Cedar Rapids, Ia.
Universal Rd. Machy. Co., Kingston, N. Y.

Wheeling Mold & Fdry. Co., Wheeling, W. Va. CRUSHERS, ROCK

CULVERTS, CAST IRON

*U. S. Pipe & Pdry. Co., Burlington, N. J.
American Casting Co., Birmingham, Ala.
Beach Mfg. Co., Charlotte, Mich.
Galion Iron Wks. & Mfg. Co., Galion, O.
Gilbert Mfg. Co., Aberdeen, S. D.
R. D. Wood & Co., Philadelphia

CULVERTS, CORRUGATED METAL

*Armoo Culvert Mfrs. Assn., Middletown, O. *Austin-Western Rd. Mach. Co., Chicago

Geod Rds. Mach. Co., Kennett Sq., Pa.
American Casting Co., Birmingham, Ala.
Austin Mfg. Co., Chicago

Bark River Bridge & Culv. Co., Bark River,
Mich.

J. D. Adams Co., Indianapolis, Ind.

CUTTING AND WELDING APPARATUM Welding Apparatus)

Welding Apparatus)

*Waukesha Motor Co., Waukesha, Wis. Austin Mig. Co., Chicago
Bark River Bridge & Culv. Co., Bark River,
Mich.
Beach Mig. Co., Charlotte, Mich.
Beatrice Steel Tank Mig. Co., Beatrice, Neb.
Berger Mig. Co. Jacksonville, Fla.
Boardman Co., Okla. City, Okla.
Burnham Mig. Co., Woods Cross, Utah
Calif. Corr. Culv. Co., W. Berkeley, Cal.
Canada Ingot Ir. Co., Ltd., Guelph, Ont.
Canton Culv. & Silo Co., Canton, O.
Decatur Cornice & Roofing Co., Albany, Ala.
Dixie Culv. & Metal Co., Atlanta, Ga.
Dixie Culv. & Metal Co., Little Rock, Ark.
Edwards Mig. Co., Little Rock, Ark.
Edwards Mig. Co., Lonianati
Galion Iron Wis., & Mig. Co., Elmira, N. Y.
Ind. Corr. Culv. Co., Mason City, Ia.
Iowa Pure Ir. Co., Des Moines, Ia.
Kentucky Culvert Mig. Co., Louisville, Ky.
Klauer Mig. Co., Denneapolis
Md. Culv. & Mig. Co., Mahoon City, Ia.
Iowa Pure Iron Co., Moberly, Mo.
Nebraska Culv. & Mig. Co., Baltimore
Missouri Pure Iron Co., Mabor City, Mo.
Nebraska Culv. & Mig. Co., Wahoo, Neb.
N. E. Metal Culv. Co., Palmer, Mass.
New England Metal Culvert Co., Nashana, N. H.
Newport Culvert Co., Newport. Ky.
Northfield Ir. Co., Northfield, Minn.
Northwest'n. Sheet & Ir. Wks., Wahpeton, N. D.
Ohio Corr. Culv. Co., Middeltown, O.
Road Supply & Metal Co., Topeka, Kan.
St. Paul Corr. Co., St. Paul. Minn.
Sloux Falls Metal Culv. Co., Salisbury, N. C.
Spokane Culv. & Tank Co., Spokane, Wash.
Tenn. Metal Culv. Co., Salisbury, N. C.
Spokane Culv. & Tank Co., Spokane, Wash.
Tenn. Metal Culvet Co., Spokane, Wash.
T

Western Metal Mfg. Co., Houston, Tex. Wheeling Corr. Co., Wheeling, W. Va. Wyatt Metal & Blr. Wks., Dallas, Tex.

CULVERT FORMS
*Blaw-Knox Company, Pittsburgh, Pa.
*Heitzel Steel Form & Iron Co., Warren, O.
Concrete Form Co., Inc., Watertown, N. Y.
Northfield Iron Co., Northfield, Minn.

FORE BOXES

**Contral Foundry Co., New York

H. W. Clark Co., Mattoon, Ill.

J. B. Clow & Sons. Chicago
Columbian Iron Wks., Chattanooga, Tenn.
Int'l. Comb. Eng. Corp., Chattanooga, Tenn.
Madison Fdry Co., Cleveland, O.

Mueller Co., Decatur, Ill.

J. S. Schofield's Sons Co., Macon, Ga.

R. D. Wood & Co., Philadelphia, Pa.

GURB, GUTTER AND BASE FORMS (See Forms, Concrete)

CURB GUARDS, STEEL W. S. Godwin Co., Baltimore

CURB, STEEL PROTECTED

*Truscon Steel Co., Youngstown, O.
Concrete Steel Co., N. Y.

CURING OF CONCRETE *Columbia Prod. Ce., Barberton, O. *Dow Chemical Co., Midland, Mich. *McEverlast, Inc., Los Angeles, Calif. *Solvay Sales Corp., N. Y. Barber Asphalt Co., Philadelphia

CUTTERS, PIPE, HAND CUTTERS, PIPE, HAND

*Ellis & Ford Mfg. Co., Detroit
Armstrong Mfg. Co., Bridgeport, Ct.
Barnes Tool Co., New Haven, Ct.
Erie Tool Works, Erie, Pa.
Greenfield Tap & Tie Corp., Greenfield, Mass.
Oawego Tool Co., Oawego, N. Y.
Reed Mfg. Co., Erie, Pa.
Walworth Mfg. Co., Boston

CUTTERS, ROD AND WIRE

*Koehring Co., Milwaukee, Wis.

Buffalo Porge Co., Buffalo, N. Y.

Carolus Mfg. Co., Sterling, Ill.

Helwig Mfg. Co., St. Paul, Minn.

M. & M. Wire Clamp Co., Minneapolis

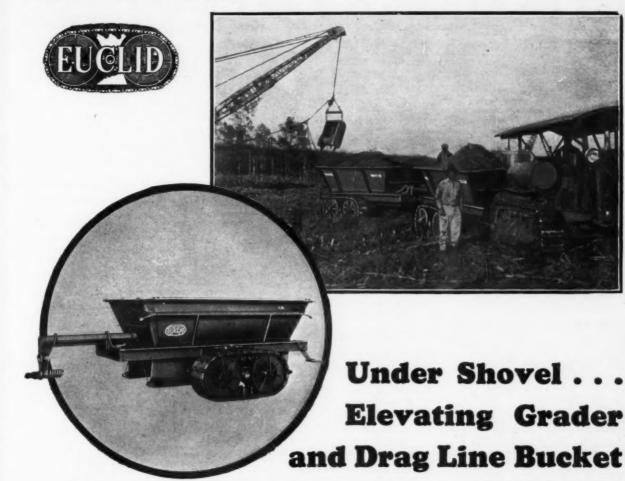
Morse-Starrett Prod. Co., Oakland, Calif.

Worthington Pump & Mchy. Corp., N. Y.

CUTTING EDGES "Caterpillar Tractor Co., San Leandro, Cal.
"General Wheelbarrow Co., Cleveland
"Shunk Mfg. Co., Bucyrus, O.
J. D. Adams Co., Indianapolis, Ind.

CUTTING AND WELDING APPARATUS (See Welding Apparatus)

DERRICKS, GUY AND STIFF-LEG
*Clyde Ir. Wks. Sales Ce., Duluth, Minn.
*Dobble Fdry. & Mach. Co., Niagara Palls, N.Y.
*S. Flory Mfg. Co., Bangor, Ps.
*Insley Mfg. Co., Indianapolis, Ind.
*J. S. Mundy Hstg. Engine Co., Newark, N. J.
*Sasgen Derrick Co., Chicago
Amer. Hst. & Derrick Co., St. Paul, Minn.
Street Bros. Mach. Wks., Chattanooga
Superior Iron Wks., Superior, Wis.
Universal Hstg. Machy. Corp., Buffalo



EUCLID TRACK WAGONS

ARE WORKING UNDER ALL THREE ON THE MISSISSIPPI LEVEES

ERE is a typical Drag Line installation at the Mississippi Levees, showing one phase of Euclid Wagon adaptability for handling more dirt, faster.

You will also find fleets of Euclid Wagons under Shovels and Elevating Graders on this great reconstruction project.

In operating they have large capacity, light draft, and short turning radius all of which insures the handling of more dirt with the least amount of effort.

In construction Euclid Wagons have doors of \(^3\)_e-inch high carbon steel plate reinforced with heavy angles, axles shafts, wheels, track shoes and other vital parts of alloy steel, carefully heat treated, a combination which provides greater strength and durability.

Whether you operate elevating graders, shovels, drag lines or all three, Euclid Wagons handle the dirt under the most trying conditions easily and at lower cost.

The EUCLID CRANI Euclid, Ohio

The EUCLID CRANE and HOIST CO.

Manufacturers of Automatic Wheel Scrapers, Rotary Scrapers and Track Wheel Dump Wagons.

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DERRICK PITTINGS

**S. Flory Mfg. Co., Bangor, Pa

**S. Flory Mfg. Co., Bangor, Pa

**Hayward Co., N. Y.

**J. S. Mundy Hatg. Engine Co., Mewark, N. J.

**Sasgen Derrick Co., Chicago

Amer. Hat. & Derrick Co., St. Paul

Buffalo Hoist & Derrick Co., Buffalo, N. Y.

Lidgerwood Mfg. Co., Elizabeth, N. J.

Street Bros. Mach. Wks., Chattanooga

DIAPHRAGM PUMPING OUTFITS

*C. H. & E. Mfg. Co., Milwaukee, Wis*Jaeger Mach. Co., Columbus, O.
*John Lauson Mfg. Co., New Holstein, Wis.
*Novo Engine Co., Lansing, Mich.
*Tool & Device Corp., Waterford, N. Y.
Chain Belt Co., Milwaukee, Wis.
Humphreys Mfg. Co., Mansfield, O.

DIESEL ENGINES (See Engines, Oil)

DISTRIBUTORS, TAR AND ASPHALT *B. D. Etnyre & Co., Oregon, Ill.
*Good Eoads Machinery Co., Kennett Sq., Pa.
*Chas Hvass & Co., New York
Kinney Mg. Co., Boston
Municipal Supply Co., So. Bend, Ind.

DISTRIBUTING PLANTS, CONCRETE *Insley Mfg. Co., Indianapolis, Ind.

*Jaeger Mach. Co., Columbus, O.

*Lakewood Eng. Co., Cleveland, O.

*Eansome Conc. Mchy. Co., Dunellen, N. J.

Archer Iron Works, Chicago

DITCHING MACHINES (See Excavators)

DOORS AND SHUTTERS, STEEL ROLLING Cornell Iron Wks., L. I. City, N. Y.
Edwards Mfg. Co., Cincinnati, O.
Holsor Sheet Metal Worke, New Orleans, La.
Kinnear Mfg. Co., Columbus, O.
James Peters & Son, Philadelphia
St. Paul Corrugating Co., St. Paul, Minn.
Variety Rolling Door Co., Westerville, O.
J. G. Wilson Corp., N. Y.

PRAGS, ROAD

*Austin-Western Road Machinery Co., Chicage
*Caterpillar Tractor Co., San Leandro, Calif.

*General Wheelbarrow Co., Cleveland

*Good Roads Machy. Co., Erankfort, N. Y.

J. D. Adams Co., Indianapolis, Ind.

American Steel Scraper Co., Sidney, Ohio
Beach Mig. Co., Charlotte, Mich.
Case Crane & Eng. Co., Columbus, O.
Chatta. Wheelbarrow Co., Chattanoogs, Tenn.
Decre & Co., Moline, Ill.
Donaldson Bros., Mt. Clemens, Mich.
Galion Iron Works & Mig. Co., Galion, O.
Jackson Mig. Co., Harrisburg, Pa.

Miskin Scraper Was., Uco., Idaho
Ryan Mig. Corp., Chicago
Sidney Steel Scraper Co., Sidney, O.
Slunsser-McLean Scraper Co., Joiney
Western Wheeled Scraper Co., Aurora, Ill.

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*Osgood Cempany, Marion, Ohio
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Link-Belt Co., Chicago
Marion Steam Shovel Co., Marion, O.

DREDGES. HYDRAULIC *Manitowoc Eng'g. Wks., Manitowoc, Wis. Amer. Steel Dredge Co., Fort Wayne, Ind. Bucyrus-Erie Co., Erie, Ps. Ellicott Mach. Corp., Baltimore Morris Mach. Wks., Baldwinsville, N. Y. DREDGING MACHINERY NEDGING MACHINERY
'S. Flory Mig. Co., Bangor, Pa.
'Manitowoc Eng'g. Wks., Manitowoc, Wis.
'J. S. Mundy Hstg. Engine Co., Newark, N. J.
Johnson Mig. Co., Seattle, Wash.
Lidgerwood Mig. Co., Elizabeth, N. J.
Street Bros. Mach. Wks., Chattanooga

DRILL STEEL SHARPENERS (See Sharpeners)

DRILLS, CORE

*McKiernan-Terry Corp., N. Y. *Sanderson-Cyclone Drill Co., Orrville, O. *Sulivan Machy. Co., Chicago Ingersoll-Rand Co., N. Y.

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*Sullivan Machy, Co., Chicage

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Gilman Mfg. Co., E. Boston

Hardsocg Wonder Drill Co., Ottumwa, I

Helwig Mfg. Co., St. Paul, Minn.

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Wood Drill Wks., Paterson, N. J. Ottumwa, Ia.

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Alex. Milburn Co., Baltimore, Md.

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Heil Co., Milwaukee
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Jennings Aut. Dump Body, Roanoke, Va.
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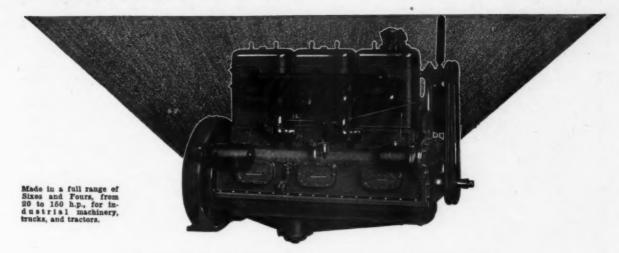
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FORMS, MANHOLE, PIPE, SEWEB, ETC.
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*Heitsel Stl. Form & Ir. Ce., Warren, Ohio
Cleveland Trencher Co., Euclid, O.
Metal Forms Corp., Milwaukee

FORMGRADERS Ted Carr & Co., Chicago

FOUNTAINS, DRINKING
Jas. B. Clow & Sons, Chicago
Int'l Comb. Eng. Corp., Chattanooga, Tenn.
Murdock Mfg. & Sup. Co., Cincinnati
Puro San. Dr. Fin. Co., Haydenville, Mass.
Rundle-Spence Mfg. Co., Milwaukee
Stewart Iron Works Co., Cincinnati, Ohio
Halsey W. Taylor Co., Warren, Ohio
Century Brass Works, Belleville, Ill.

FRESNOES (See Scrapers, Rotary)

Bristol Co., Waterbury, Conn.
Builders Iron Foundry, Providence, R. I.
W. & L. E. Gurley, Troy, N. Y.
Lunkenheimer Co., Cincinnati, Ohio
Simplex Vaire & Meter Co., Philadelphia
Walworth Mfg. Co., Boston

GARRAGE COLLECTION EQUIPMENT GABBAGE COLLECTION EQUIPMENT
"Highway Trailer Co., Edgerton, Wis.
"Chas. Hvass & Co., New York
"Littleford Bros., Cincinnati
Atia Sales Corp., New York
Autocar Company, Ardmore, Pa.
Detroit Trailer & Mach. Co., Detroit
Freuhauf Trailer Co., Detroit, Mich.
Heil Co., Milwaukee
Geo. H. Holsbog & Bros., Jeffersonville, Ind.
Lee Trailer & Body Co., Plymouth, Ind.
B. Nicoll & Co., New York
Smith Trailer Co., Syracuse, N. Y.
Troy Trailer & Wagon Co., Troy, Ohio

GARBAGE DISPOSAL SYSTEMS

ARBAGE DIAPOSAL SYSTEMS
C. O. Bartlett & Snow Co., Cleveland
Decarie Incinerator Co., L. I. City, N. Y.
Hiler Eng. & Const. Co., Brooklyn, N. Y.
Morse-Boulger Destructor Co., New York
Nye Odorless Incinerator Corp., Albany, Ga.
Pittsburgh-Des Moines Steel Co., Pittsburgh,
Ps.,
Superior Incinerator Co. of Dallas, Dallas, Tex.

GASOLINE STORAGE TANKS

ASCLINE STORAGE TANKS

Biggs Boiler Works, Akron, Ohio

Birmingham Tank Co., Birmingham, Ala.

S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

Chicago Bridge & Iron Works, Chicago

Graver Corp., East Chicago, Ind.

Heil Co., Miwaukee, Wis.

Lancaster Iron Works, Inc., Lancaster, Pa.

Wm. B. Scaife & Sons, Pittsburgh, Pa.

Tokheim Oil Tank & Pump Co., Ft. Wayne,
Ind.

United Iron Works, Inc., Kansas City, Mo.

Wayne Co., Fort Wayne, Ind.

Chapman Valve Mfg. Co., Indian Orchard, Mass. Coffin Valve Co., Boston, Mass. Coldwell-Wilcox Co., Newburgh, N. Y. R. Hardesty Mfg. Co., Denver Rodney Hunt Machine Co., Orange, Mass. Ladlow Valve Mfg. Co., Troy, N. Y.

GATES FOR PARKS AND CEMETERIES

American Steel & Wire Co., Chicago Stewart Iron Works Co., Cincinnati, Ohio Wayne Iron Works, Wayne, Pa.

GLASS, FIREPROOF (See Wire Glass)

GRADERS, EOAD (See Road Graders)

GRADER BLADES

*General Wheelbarrow Co., Cleveland, C. *Shunk Mfg. Co., Bucyrus, Ohio J. D. Adams Co., Indianapolis, Ind. Galion Ir. Works & Mfg. Co., Galion, Ohio

GRANDSTANDS, PORTABLE

Circle-A. Prod. Corp., Newcastle, Ind. Leavitt Mfg. Co., Urbana, Ill. Wayne Iron Works, Wayne, Pa.

*Blaw-Knox Co., Pittsburgh Hendrick Mfg. Co., Carbondale, Pa.

*D-A Lubricant Ce., Inc., Indianapolis *Jes. Dixon Crucible Ce., Jersey City, N. J.

GRIZZLIES

Allis-Chalmers Mfg. Co., Milwaukee Austin Mfg. Co., Chicage C. O. Bartlett & Snow Co., Cleveland Robins Conv. Belt Co., New York Smith Engineering Works, Milwaukee Stephens-Adamson Mfg. Co., Aurora, Ill.

GROUT MIXERS & PLACERS, PNEUMATIC *Ransome Concrete Machy. Co, Dunellen, N. J. Cement-Gun Co., Inc., Allentown, Pa. GUARD RAIL HIGHWAY

*Am. Steel & Wire Co., Chicago
*Williamsport Wire Rope Co., Williamsport, Pa.
Cyclone Fence Co., Waukegan, Ill.
W. S. Godwin Co., Baltimore, Md.
Hasard Wire Rope Co., Wilkewbarre, Pa.
J. H. Ramsey, Albany, N. Y.
W. F. Robertson Stl. & Iron Co., Cincinnati
Stewart Iron Works Co., Cincinnati
Wickwire-Spencer Steel Co., New York

HAMMERS, STEAM, PILE (See Pile Hammers,

HEATING KETTLES (See Kettles)

*Sasgen Derrick Co., Chicago *Sasgen Derrick Co., Cleveland, Ohio Detroit Trailer & Machine Co., Detroit Trail-T Co., St. Paul, Minn. Whitehead & Kales Co., Detroit

HOISTS, BELT-DRIVEN

*Amer. Saw Mill Mchy. Co., Hackettstown, N. J. *Brown Clutch Co., Sandusky, Ohio
*Clyde Iron Works Sales Co., Duluth, Minn.
*Dobble Fdry. & Mach. Co., Niagara Palis
*Domestic Engine & Pump Co., Shippensburg,

*Domestic Engine & Pump Co., Shippensburg, Pa.

*J. S. Mundy Hstg. Engine Co., Newark, N. J.
American Hoiat & Derrick Co., St. Paul, Minn.
Lidgerwood Mfg. Co., Elizabeth, N. J.
Mead-Morrison Mfg. Co., Boston, Mass.
Street Bros. Mach. Works, Chatanooga
Universal Hoist & Mfg. Co., Cedar Falls, Ia.
Weller Mfg. Co., Chicago
Williams Hoist Co., Los Angeles, Calif.

HOISTS, CONCRETE, TOWER

*Brown Clutch Co., Sandusky, Ohio *C. H. & E. Mig. Co., Milwaukee, Wis. *Clyde Iron Works Sales Co., Duluth, Minn. *Domestic Eng. & Pump Co., Shippensburg, Pa.

Pa.

*Insley Mfg. Co., Indianapolis, Ind.

*Jaeger Mach. Co., Columbus, O.

*Lakewood Eng. Co., Cilcreland, Ohio

*J. S. Mundy Hstg. Engine Co., Newark, N. J.

*Novo Engine Co., Lansing, Mich.

*Ransome Conc. McNy. Co., Dunellen, N. J.

English Bros. Machy. Co., Kansas City

Lidgerwood Mfg. Co., Elizabeth, N. J.

Mead-Morrison Mfg. Co., Boston

Street Bros. Mach. Works, Chattanooga

HOISTS, ELECTRIC

*Brown Clutch Co., Sandusky, Ohio
*C. H. & E. Mig. Co., Milwaukee, Wis
*Clyde Iron Works Sales Co., Duluth, Minn.
*Dake Eng. Co., Grand Haven, Mich.
*Dobble Fdry. & Mach. Co., Niagara Palis
*Domestic Eng. & Pump Co., Shippensburg,
Pa.

*Dobble Fdry. & Mach. Co., Niagara Palls *Domestic Eng. & Pump Co., Shippensburg. Pa.

*S. Flory Mfg. Co., Bangor, Pa.

*Industrial Brownhoist Corp., Cleveland *McKiernan-Terry Corp., New York *J. S. Mundy Hstg. Engine Co., Newark, N. J. *Novo Engine Co., Lansing, Mich. *O. K. Clutch & Mach. Co., Columbia, Pa. *Sullivan Machy. Co., Chicago Am. Hoist & Derrick Co., St. Paul, Minn. Buffalo Hoist & Derrick Co., Buffalo, N. Y. Chisholm-Moore Co., Cleveland, Ohio Construction Machy. Co., Waterloo, Ia. Norris K. Davig, San Francisco, Calif. Detroit Hoist & Mach. Co., Detroit English Bros. Machy Co., Kansas City Gardner-Denver Co., Quincy. Ill. Harnischfeger Corp., Milwaukee Lidgerwood Mfg. Co., Elizabeth, N. J. Mead-Morrison Mfg. Co., Boston Northern Engineering Works. Detroit Orr & Sembower, Reading, Pa. Sterling Machinery Corp., Kansas City, Mo. Street Bros. Mach. Works, Chattanooga Themas Elevator Co., Chicago Treadwell Engineering Co., Easton, Pa. Universal Hoist & Mfg. Co., Codar Falls, Iowa Vulcan Iron Works, Wilkes-Barre, Pa. Williams Hoist Co., Los Angeles, Calif.

HOISTS, GASOLINE

#Amer. Cement Mach. Co.., Inc. Keokuk, Iowa

*Amer. Saw Mill Mchy. Co., Hackettstown,
N. J.

*Brown Clutch Co., Sandusky, Ohio

*C. H. & E. Mfg. Co., Milwaukee

*Clyde Iron Works Sales Co., Duluth, Minn.

*Dake Engine Co., Grand Havon, Mich.

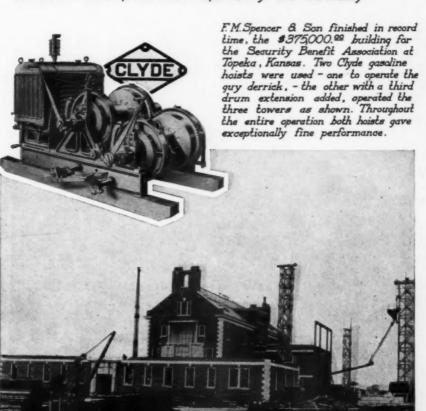
*Domestic Eng. & Pump Co., Shippensburg, Pa.

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*Jasger Mach. Co., Columbus, O.

*McKlernan-Terry Corp., New York

*J. S. Mundy Hatg. Engine Co., Rewark, N. J.

*Neve Engine Co., Lansing, Mich.

*O. K. Clutch & Mach. Co., Columbia, Pa.

Am. Hoist & Derrick Co., St. Paul, Minn.

Amer. Mfg. & Eng. Co., Kalamasoo, Mich.

Beach Mfg. Co., Charlotte, Mich.

Beach Mfg. Co., Charlotte, Mich.

Bouffalo Hoist & Derrick Co., Buffalo, N. Y.

Construction Machy. Co., Waterloo, Ia.

Norris K. Davis, San Francisco, Calif.

Dyrr Mfg. Co., Huntington Park, Calif.

English Bros. Machy. Co., Kansas City, Mo.

Ersted Mfg. Co., Portland, Ore.

Lidgerwood Mfg. Co., Elizabeth, N. J.

Mead-Morrison Mfg. Co., Boaton

Orr & Sembower, Reading, Pa.

Sterling Machinery Corp., Kansas City, Mo.

Street Bros. Mach. Works, Chattanooga

Thomas Elevator Co., Chicago

Universal Hoist & Mfg. Co., Cedar Falls, Iowa

Williams Hoist Co., Los Angeles, Calif. HOISTS, GASOLINE (Centinued)

HOISTS, HAND

*Beebe Bros, Inc., Seattle, Wash.
*Clyde Iron Works Sales Co., Duluth, Minn.
*Dobble Fdry. & Mach. Co., Niagara Falls, N.Y.
*Sasgen Derrick Co., Chicago

HOISTS, PNEUMATIC

**PORTON OF THE PROPERTY OF TH

HOISTS, PORTABLE

HOISTS, POBTABLE

*Beebe Bros., Inc., Seattle, Wash.

*Erown Clutch Co., Sandusky, Ohio

*C. H. & E. Mfg. Co., Milwaukee, Wis.

*Clyde Iron Works Sales Co., Duluth, Minn.

*Sasgen Derrick Co., Chicage

*W.K.M. Co., Inc., Houston, Tex.

Erated Mfg. Co., Optiland, Ore.

Joliet Mfg. Co., Joliet, Ill.

Jas. B. Seaverns Co., Batavia, Ill.

HOISTS, STEAM

HOISTS, STEAM

*Clyde Iron Works Sales Co., Duluth, Minn.
*Dake Engine Co., Grand Haven, Mich.
*S. Flory Mfg. Co., Bangor, Pa.
*McKiernan-Terry Corp., New York
*J. S. Mundy Hstg. Engine Co., Newark, N. J.
*Sullivan Machinery Co., Chicago
Am. Hoist & Derrick Co., St. Paul, Minn.
Buffalo Hoist & Derrick Co., Buffalo, N. Y.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Lidgerwood Mfg. Co., Elizabeth, N. J.
Mead-Morrison Mfg. Co., Elizabeth, N. J.
Mead-Morrison Mfg. Co., Boston
Orr & Sembower, Reading, Pa.
Street Bros. Mach. Works, Chattanooga
Thomas Elevator Co., Chicago
Treadwell Engineering Co., Easton, Pa.

HOISTS FOR MOTOR TRUCKS

HOISTS FOR MOTOR TRUCKS

*Beebe Bros., Inc., Seattle, Wash.

*Brown Clutch Co., Sandusky, Ohio

*Hughes-Keenan Co., Mansfield, O.

*Hydr. Hoist Mfg. Co., St. Paul, Minn.

*Sasgen Derrick Co., Chicago

*Wood Hydr. Hoist & Body Co., Detroit

Atia Sales Corp., New York

Ersted Mfg. Co., Fortland, Ore.

Hell Co., Milwaukee

Joliet Mfg. Co., Joliet, Ill.

Lidgerwood Mfg. Co., Elisabeth, N. J.

Van Dorn Iron Works Co., Cleveland, Ohio

HOPPERS, CONCRETE (Aggregate Measuring)

HOPPERS, CONCRETE (Aggregate Measurin, "Blaw-Knox Company, Pittsburgh, Pa. "Eutler Bin Co., Waukesha, Wis. "Erie Stl. Const'in. Co., Erie, Pa. "Heitzel Stl. Form & Ir. Co., Warren, Ohio "Lakewood Eng. Co., Cleveland, Ohio "Ransome Conc. Mchy. Co., Dunellen, M. J. C. S. Johnson Co., Champaign, Ill. Jas. B. Seaverns Co., Batavia, Ill. Superior Engineering Co., Warren, Ohio

HOSE, AIR *The Buhl Company, Chicago *Independent Pneu. Tool Co., Chicago Boston Woven Hose and Rubber Co., Cambridge, Mass.
Chicago Pneumatic Tool Co., New York Cincinnati Rubber Mfg. Co., Cincinnati Cleveland Rock Drill Co., Cleveland, Ohio The Dallett Co., Philadelphia, Pa. Gilman Mfg. Co., East Boston, Mass. B. F. Goodrich Rubber Co., Akron Goodyear Tire & Rubber Co., Akron, Ohio Ingersoil-Rand Co., New York Mulconroy Co., Inc., Philadelphia, Pa. Penna, Flexible Metallic Tubing Co., Phila., Pa.
Republic Rubber Co., Youngstown, Ohio United States Rubber Co., New York

HOSE COUPLINGS (See Couplings, Hose)

HOSE, PIRE

USE, FAME

Bi-Lateral Fire Hose Co., Chicago
Eureka Fire Hose Mfg. Co., New York
Fabric Fire Hose Co., New York
Fabric Fire Hose Co., New York
Bg. F. Goodrich Rubber Co., Akron, Ohio
Goodyear Tire & Rubber Co., Akron, Ohio

HOUSE NUMBERS

Hamilton Metal Prod. Co., Hamilton, Ohio C. H. Hanson Co., Chicago Premax Products, Inc., Niagara Falls, N. Y.

HOUSES, PORTABLE (See Portable Buildings)

HYDRANTS, FIRE

Chapman Valve Mfg. Co., Indian Orchard, Mass. Mass.
Columbian Ir. Works, Chattanooga, Tenn.
A. D. Cook, Inc., Lawrenceburg, Ind.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eddy Valve Co., Waterford, N. Y.
Iowa Valve Co., Oskaloosa, Iowa
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ladlow Valve Mfg. Co., Elmira, N. Y.
Ladlow Valve Mfg. Co., Troy, N. Y.
Michigan Valve & Edry Co., Detroit
Norwood Eng. Co., Florence, Mass.
Rensaelaer Valve Co., Troy, N. Y.
Vogt Bros. Mfg. Co., Louisville, Ky.
Waterous Co., St. Paul
R. D. Wood & Co., Philadelphia, Ps.

HYDRAULIC RAMS

Deming Co., Salem, Ohio Johnson Mfg. Co., Seattle, Wash. Rife Hydraulic Engine Co., New Y Rumsey Pump Co., Seneca Falls, N.

IGNITION SYSTEMS

*Bisemann Magneto Corp., New York
American Bosch Magneto Corp., Springfield, Mass.
Dayton Eng. Lab. Co., Dayton, Ohio
Splitdorf Electric Co., Newark, N. J.

INCINERATORS, GARBAGE (See Garbage Dis-

INDICATOR POSTS (See Valves)

INSPECTING ENGINEERS

INSPECTING ENGINEERS

*W. R. Conard, Burlington, N. J.

*Patsig Testing Laboratories, Des Moines, Ia.

Allentown Testing Laboratory, Allentown, Pa.

E. L. Conwell & Co., Philadelphia, Pa.

Gulick-Henderson Co., New York

Robert W. Hunt Co., Chicago, III,

New York Testing Lab., New York

Pittsburgh Testing Lab., Pittsburgh

INSTRUMENTS AND SUPPLIES (Surveyors'

NSTRUMENTS AND SUPPLIES (Sur and Engineers')

Wm. Ainsworth & Sons, Denver, Cel. L. Beckman Co., Toledo, Ohio C. L. Berger & Sons, Boston Brandis & Sons, Inc., Brooklyn, N. Y. Buff & Buff Mg. Co., Boston Eugene Dietsgen Co., Chicago W. & L. E. Gurley, Troy, N. Y. Keuffel & Essor Co., Hoboken, N. J. Kolesch & Co., New York A. Lietz Co., San Francisco Leupold-Volpel & Co., Portland, Ore. Lufkin Rule Co., Saginaw, Mich. Warren-Knight Co., Philadelphia, Pa. F. Weber & Co., Philadelphia, Pa. F. Weber & Co., Milwaukee, Wis.

INTEGRAL CURB AND BASE FORMS (See Forms, Concrete)

Boston Woven Hose and Rubber Co., Cam- IRON WORK, STEUCTURAL AND ORNA-bridge, Mass. MENTAL, (See Bridges and Buildings)

JACKS, LIPTING

**McKiernan-Terry Corp., New York
**Templeton, Kenly & Co., Chicago
Duff-Norton Mfg. Co., Pittsburgh, Pa.
Joyce-Cridland Co., Dayton, Ohio
Rees Mfg. Co., Pittsburgh, Pa.
Watson-Stillman Company, New York

JACKS. PIPE FORCING

*Tempiston, Kenly & Co., Chicago Duff-Norton Mfg. Co., Pittsburgh, Pa. Easy Mfg. Co., Lincoln, Neb.

JAIL AND PRISON WORK

Fries & Son Steel Const. & Eng. Co., Coving-ton, Ky.
Manly Jail Works, Dalton, Ga.
Pauly Jail Building Co., St. Louis, Mo.
Southern Prison Co., San Antonio, Tex.
Stewart Iron Works Co., Cincinnati, Ohio
Van Dorn Iron Works Co., Cleveland.

JOINTS, EXPANSION PAVING (See Expansion Joint Material)

JOINTS, FLEXIBLE PIPE (See Flexible Joints)

JOINT COMPOUND, SEWER PIPE

**Philip Carey Co., Cincinnati, Ohio
*Jos Dixon Crucible Co., Jersey City, N. J.
Atlas Mineral Prod. Co., Mertztown, Pa.
The Leadite Co., Philadelphia, Pa.
Pacific Flush Tank Co., Chicago and N. Y.
Ruberoid Co., New York
Waring-Underwood Co., Philadelphia, Pa.

JOINT MATERIAL FOR CAST IRON PIPE

Hydraulic Development Co., Boston The Leadite Co., Philadelphia, Pa. United Lead Co., New York

JOISTS, STEEL

"Truscon Steel Co., Youngstown, Ohio Berger Mfg. Co., Canton, Ohio Genfire Steel Co., Youngstown, Ohio Ingalls Steel Prod. Co., Birmingham, Ala. Kalman Steel Co., Chicago

KETTLES, FOR ASPHALT AND TAR

CETTLES, FOR ASPHALT AND TAR

*Chausse Oil Burner Co., Elkhart, Ind.

*Connery & Co., Inc., Philadelphia, Pa.

*Good Roads Mchy. Co., Kennett Square, Pa.

*Jos. Honhorst Co., Cincinnati, Ohio

*Chas. Hvass & Co., New York

*Littleford Bros., Cincinnati, Ohio

*Littleford Bros., Cincinnati, Ohio

*Union Iron Works, Inc., Hoboken, N. J.

Aeroil Burner Co., West New York, N. J.

Barber Asphalt Co., Philadelphia

Beach Mfg. Co., Charlotte, Mich.

Charleroi Iron Wks., Charleroi, Pa.

Hauck Mfg. Co., Brooklyn, N. Y.

Kinney Mfg. Co., Boston, Mass.

Lancaster Iron Works, Inc., Lancaster, Pa.

Macleod Co., Cincinnati, Ohio

Spears-Wells Mchy. Co., Oakland, Cal.

G. L. Stuebner Ir. Wks., Inc., Long Island

City, N. Y.

Tarrant Mfg. Co., Saratoga Springs, N. Y.

Universal Rd. Mach. Co., Kingston, N. Y.

LANTERNS, CONTRACTORS

*B. E. Dietz Co., New York *National Carbide Sales Corp., New York Defiance Lantern & Stamping Co., Rochester, N. Y. N. Y. Economy Electric Lantern Co., Chicago Handlan Buck Mfg. Co., St. Louis National Carbon Co., Inc., New York Star Headlight & Lantern Co., Rochester, N.Y.

LATH. METAL

LATH, METAL

*Truscon Steal Co., Youngstown, Ohio
Berger Mfg. Co., Canton, Ohio
Bostwick Steel Lath Co., Niles, Ohio
Consolidated Exp. Metals Co., Wheeling, W.Va.
Decatur Cornice & Roofing Co., Albany, Ala.
Edwards Mfg. Co., Cincinnasi
Genfire Steel Co., Youngstown, Ohio
Kalman Steel Co., Chicago
Milwankee Corr. Co., Milwankee, Wis,
Northwestern Exp. Metal Co., Chicago
St. Paul Corr. Co., St. Paul, Minn.
Sykes Metal Lath and Roofing Co., Niles, O.
Wheeling Corr. Co., Wheeling, W. Va.
Youngstown Pressed Steel Co., Warren, O.

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Ideal Power Lawn Mower Co., Lansing, Mich.
Jacobson Mfg. Co., Racine, Wis.
Modern Mach. Works, Milwaukee
Penna. Lawn Mower Works, Philadelphia, Pa.
Phila. Lawn Mower Co., Philadelphia, Pa.
S. P. Townsend Co., Bloomfield, N. J.
Worthington Mower Co., Stroudsburg, Pa.

LAWN MOWER SHARPENERS

Fate-Root-Heath Co., Plymouth, Ohio

LEAD-MELTING FURNACES

*Littleford Bros., Cincinnati, Ohio Aeroll Burner Co., West New York, N. J. Chicago Flexible Shaft Co., Chicago Hauck Mfg. Co., Brooklyn, N. Y. Macleod Co., Cincinnati A. P. Smith Mfg. Co., East Orange, N. J.

LETTERING GUIDES

Wood-Regan Inst. Co., So. Orange, N. J.

LIGHTS, ACETYLENE

*Nat'l. Carbide Sales Corp., New York

*Oxweld Accytiene Co., New York
General Electric Co., Schenectady, N. Y.
Kohler Co., Kohler, Wis.

Alex. Milbura Co., Baltimore, Md.
Westinghouse El. & Mfg. Co., E. Pittsburgh,
Pa.

LIGHTING STANDARDS (See Street Lamp

LIGHTS, WARNING

*Toledo Pressed Steel Co., Toledo, Ohio McCloskey Torch Co., Toledo, Ohio National Carbon Co., New York Niles Mach. Co., Lebanon, N. H.

LIQUID CHLORINE

Arnold, Hoffman & Co., Inc., New York Electro Bleaching Gas Co., New York Hooker Electrochemical Co., New York Mathieson Alkali Works, Inc., New York Penna. Salt Mfg. Co., Philadelphis, Pa.

LOADERS, GRAVEL, WAGON, CAB, ETC.

Atlas Engineering Co., Clintonville, Wis.
Barber-Greene Co., Aurora, Ill.
**Barber-Greene Co., Chicago Conveying Weigher Co., New York
**Beltsel St. Form & Ir. Co., Warren, Ohie
**Industrial Brownhoist Cerp., Cleveland
Nelson Iron Works, Passaic, N. J.
**Trackson Co., Milwaukee, Wis.
**Bonney Supply Co., Inc., Rochester, N. Y.
**Conant Mach. Co., Concord Junct., Mass.
**Fairfield Engineering Co., Marion, Ohio
**F-S Mig. Co., Now Holstein, Wis.
**Galion Iron Works & Mig. Co., Galion, Ohio
Gifford-Wood Co., Hudson, N. Y.
**Jeffrey Mig. Co., Columbus, Ohio
Kent Machine Co., Kent, Ohio
**Lamson Co., Syracuse, N. Y.
**Lee Trailer & Body Co., Plymouth, Ind.
**Link-Belt Co., Chicago
**Louisville, Ky.
**Now Holland Mch. Co., N. Holland, Pa.
**Northern Conveyor Co., Janesville, Wis.
**Portable Machinery Co., Clifton, N. J.
**H. B. Sackett Screen & Chute Co., Chicago
**Spears-Wells Mchy, Co., Oakland, Cal.
**Specialty Engineering Co., Philadelphis, Pa.
**Star Drilling Mach. Co., Kingston, N. Y.
**Woller Mig. Co., Chicago

LOCKERS, STEEL

OGRERS, STEEL

All-Steel Equip. Co., Aurora, III.
Berger Mfg. Co., Canton, Ohio
Durabilt Steel Locker Co., Aurora, III.
Durand Steel Locker Co., Chicago
Hart & Hutchinson Co., N. Britain, Conn.
Lyon Metal Products, Inc., Aurora, III.
Fred. Medart Mfg. Co., St. Louis, Mo.
Narragansett Mach. Co., Providence, R. I.

LOCOMOTIVES, FOR CONTRACTORS, ETC.

*Brookville Locomotive Co., Brookville, Pa.
*Brookville Locomotive Co., Brookville, Pa.
*Pavenport Loco. & Mrg. Corp., Davenport, Is.
Baldwin Loc. Works, Philadelphia, Pa.
Fate-Root-Heats Co., Plymouth, Ohio
Heisler Locomotive Works, Erie, Pa.
Lima Loc. Works, Lima, Ohio
Mid-West Locomotive Works, Hamilton, O.
Milwaukee Loc. Mfg. Co., Milwaukee

H. K. Porter Co., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Ps. Geo. D. Whitcomb Co., Rochelle, Ill.

*D-A Lubricant Co., Indianapolis, Ind. *Joseph Dixon Crucible Co., Jersey City, N. J. Atlantic Refining Co., Inc., Philadelphia Texas Co., New York

LUBRICATORS

The Bassick Mfg. Co., Chicago Carr Fastener Co., Cambridge, Mass. McCord Radiator Mfg. Co., Detroit

MANGANESE STEEL PRODUCTS

American Manganese St. Co., Chicago, H'ts,Ill. Taylor-Wharton Ir. & St. Co., High Bridge,N.J.

MANHOLE COVERS (See Castings)

METAL LATH (See Lath)

METAL ROOFING (See Roofing)

H. W. Clark Co., Mattoon, Ill. Clarksville Fdry. & Mach. Co., Clarksville, Tenn.
J. B. Clow & Sons, Chicago
J. B. Clow & Sons, Chicago
Columbian Iron Works, Chattanoogs, Tenn.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Ford Meter Box Co., Wabash, Ind.
Mueller Co., Decatur, Ill.
J. S. Schofield's Sons Co., Macon, Ga.

METER COUPLINGS

*Neptune Meter Co., New York

H. W. Clark Co., Mattoon, Ill.
Hersey Mfg. Co., So. Boston, Mass.
Mueller Co., Decatur, Ill.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa. Union Water Meter Co., Worcester, Mass.

METER TESTERS

"Neptune Meter Co., New York
H. W. Clark Co., Mattoon, Ill.
Ford Meter Box Co., Wabash, Ind.
Mueller Co., Decatur, Ill.
National Meter Co., New York
Pittsburgh Equitable Meter Co., Pittsburgh,
Pa.

METERS, ELECTRIC (WATTHOUR)

Duncan Elec. Mfg. Co., LaFayette, Ind. General Electric Co., Schenettady, N. Y. Sangamo Electric Co., Springfield, Ill. Westinghouse Electric & Mfg. Co., East Pitts-burgh, Pa.

METERS, WATER, OIL & GASOLINE

*Neptune Meter Co., New York
Badger Meter Mfg. Co., Milwaukee
Buffalo Meter Co., Buffalo, N. Y.
Gamon Meter Co., Newark, N. J.
Hersey Mfg. Co., Boston, Mass.
National Meter Co., New York
Pittsburgh Equitable Meter Co., Pittsburgb. Pa.

Phoenix Meter Co., Prince Bay, St. Isl., N. Y.
A. P. Smith Mfg. Co., E. Orange, N. J.

Thomson Meter Corp., New York
Union Water Meter Co., Worcester, Mass.

Worthington Pump & Mchy. Corp., New York

METERS, WATER (VENTURI TYPE)

Builders Iron Fdry., Providence, R. I. National Meter Co., New York Simplex Valve & Meter Co., Philadelphia, Pa.

MIXERS, CONCRETE (See Concrete Mixers)

MIXERS, GROUT

**Jaeger Mach. Co., Columbus, O.
**Lakewood Eng. Co., Cleveland, Ohio
**Littleford Bros., Cincinnati
**Union Iron Works, Inc., Hoboken, M. J.
**T. L. Smith Co., Milwaukee, Wis.
Kent Mach. Co., Cuyahoga Falls, Ohio

MIXERS, MORTAR

*C. H. & E. Mfg. Co., Milwaukee, Wis. *Jaeger Machine Co., Columbus, Ohio *Koehring Co., Milwaukee *Lakewood Eng. Co., Cleveland, Ohio

*Lansing Co., Lansing, Mich.

*John Lauson Mfg. Co., New Holstein, Wis.

*Ransome Conc. Mchy. Co., Dunellen, M. J.

*T. L. Smith Co., Milwaukee, Wis.

Anchor Mfg. Co., Chicago

Archer Iron Works, Chicago

Blystone Mfg. Co., Cambridge Spgs., Ps.

Construction Machy. Co., Waterloo, Iowa

Norris K. Davis, San Francisco, Calif.

Kent Machine Co., Kent, Ohio

Kiel Machine Co., Kiel, Wis.

Knickerbocker Co., Jackson, Mich.

Kwik-Mix Concrete-Mixer Co., Port Washington, Wis.

ton, Wis. Meili-Blumberg Co., New Holstein, Wis. Standard Scale & Sup. Corp., Pittsburgh Talbot-Flood Mfg. Co., Kansas City, Mo.

MIXERS, PLASTER

Conveying Weigher Co., N. Y.

Jaeger Machine Co., Columbus, Ohio

John Lauson Mfg. Co., New Holstein, Wis.
Anchor Mfg. Co., Chicago

Blystone Mfg. Co., Cambridge Spgs., Pa.
Construction Machy. Co., Waterloo, Iowa
Norris K. Davis, San Francisco, Callif.
Essick & Co., Los Angeles, Cal.
Knickerbocker Co., Jackson, Mich.
Leach Co., Oshkosh, Wis.

Meili-Blumberg Co., New Holstein, Wis.
Standard Scale & Sup. Corp., Pittsburgh
Talbot-Flood Mfg. Co., Kansas City, Mo.

MORTAR BOXES

MORTAR BOXES

*General Wheelbarrow Co., Cleveland, Ohio

*Heltzel Stl. Form & Ir. Co., Warren, Ohio

*Jos. Honhorst Co., Cincinnatt, Ohio

*Littleford Bros., Cincinnatt

Anchor Mfg. Co., Chicago, Ill.

Beatrice Steel Tank Mfg. Co., Beatrice, Neb.

Canton Art Metal Co., Canton, Ohio

Cleveland Wheelbarrow Co., Cleveland

Durlach Can & Iron Wks., Brooklyn, N. Y.

Norris K. Davis, San Francisco, Calif.

Donley Bros. Co., Cleveland, O.

Empire Motal Tank Wks., E. Rochester, N. Y.

Excelsior Motor Mfg. & Supply Co., Chicago Harley-Davidson Motor Co., Milwaukee Indian Motocycle Co., Springfield, Mass.

MOTORS, GASOLINE (See Engines, Gas and Gasoline)

MOTOR TRUCKS

**MOTOR TRUCKS

**Dodge Bros. Corp., Detroit

*International Harvester Co., Chicago

**White Co., Cleveland, Ohio

Acme Motor Truck Co., Cadillac, Mich.

Amer.-La France & Foamite Corp., New York

Atterbury Motor Car Co., Buffalo, N. Y.

Autocar Co., Ardmore, Pa.

Brockway Motor Truck Co., Cortland, N. Y.

Clydesdale Motor Truck Co., Cortland, N. Y.

Clydesdale Motor Truck Co., Chicago

Duplex Truck Co., Lansing, Mich.

Federal Motor Truck Co., Detroit

Ford Motor Co., Detroit

Ford Motor Co., Detroit

Ford Motor Truck Co., Chicago

Gramm Motors, Inc., Lima, Ohio

The Hug Co., Highland, Ill.

Indiana Truck Corp., Marion, Ind.

La France-Republic Sales Corp., New York

Larabee-Deyo Motor Tr. Co., Binghamton, N.Y.

Luedinghaus-Espenschied Wagon Co., St. Louis

Mack Trucke, Inc., New York

Pierce-Arrow Motor Car Co., Buffalo

Reo Motor Car Co., Lansing, Mich.

Standard Motor Truck Co., Detroit

Sterling Motor Truck Co., Milwaukee

Stewart Motor Corp., Buffalo, N. Y.

Trafic Motor Truck Co., St. Louis, Mo.

Walter Motor Truck Co., L. I. City, N. Y.

Yellow Truck & Coach Mfg. Co., Chicago

MOULDS, CONCRETE

*Blaw-Knox Co., Pittsburgh, Pa. *Heltzel Stl. Form & Ir. Co., Warren, Ohio

MUCKING, MACHINES

Hoar Shovel Co., Duluth, Minn.

NUMBERS, HOUSE (See House Numbers)

OILS, ROAD

*Standard Oil Co. (Indiana), Chicago
*Standard Oil Co. (N. Y.), N. Y.
Atl. Ref. Co., Inc., Philadelphia, Pa.
Barber Asphalt Co., Philadelphia, Pa.
Headley Good Roads Co., Philadelphia, Pa.
Standard Oil Co. (La), N. Orleans, La.
Standard Oil Co., (N. J.) Newark, N. J.
Texas Company, N. Y.

^{*} Indicates that the manufacturer carries an advertisement. See index facing inside back cover. *



THE 1930 MULTI FOOTE PAYER Speed-Service-Success

THE FOOTE COMPANY, INC. OF NUNDA, N.Y. World's Largest Exclusive Builders of Boad Payers

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OXY-ACETYLENE APPARATUS

*Oxweld Acetylene Co., Long Island City, N.Y. Macleod Co., Cincinnati Alex. Milburn Co., Baltimore, Md.

PACKING, WATER PIPE

The Leadite Co., Philadelphia, Pa. United Lead Company, N. Y.

PAINTING MACHINERY

*Littleford Bros., Cincinnati **Existicford Bros., Cincinnati
Binks Spray Equipment Co., Chicago
Chicago Pneumatic Tool Co., New York
De Vilbins Mfg. Co., Toledo, Ohio
Eclipse Air Brush Co., Newark, N. J.
Hobart Brothers Co., Troy, Ohio
Macleod Co., Cincinnati
W. N. Matthews Corp., St. Louis
Alex. Milburn Co., Baltimore, Md.
Passche Air Brush Co., Chicago
Simons Paint Spray Brush Co., Dayton. Ohio
Spraco Painting Equip. Co., Boston

Western Shale Products Co., Ft. Scott, Kans.
Western Shale Products Co., Westport Paving Brick Co., Westport

PAINTS, METAL PROTECTION

**Barrett Ce., New York

*Carey Ce., Philip, Cincinnati

*Jos. Dixon Crucible Co., Jersey City, N. J.

*McEverlast, Inc., Los Angeles, Calif.

*Solvay Sales Corp., New York

Acme White Lead & Color Works, Detroit

Barber Asphalt Co., Philadelphia, Pa. Rome White Lead & Color Works, Detroit
Barber Asphalt Co., Philadelphia, Pa.
Berry Bros., Detroit
Cook Paint & Varnish Co., Kansas City, Mo.
Detroit Graphite Co., Detroit
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
Euclid Chemical Co., Cleveland, Ohio
Hoosier Paint Works, Ft. Wayne, Ind.
Minwax Co., N. Y.
Protexol Corp., Kenilworth, N. J.
Ruberoid Co., N. Silvericised Products Corp., Chicago
Sherwin-Williams Co., Cleveland, Ohio
L. Sonneborn Sons, N. Y.
Toch Brothers, N. Y.
Tropical Paint & Oil Co., Cleveland, Ohio
Truscon Laboratories, Detroit

PARK BENCHES

Logan Co., Louisville, Ky.
Fred J. Meyers Mfg. Co., Hamilton, Ohio
Millersville Supply Co., Millersville, Pa.
Stewart Iron Works Co., Cincinnati, Ohio
Van Dorn Iron Works Co., Cleveland

PAVEMENT BREAKERS (See Breakers)

PAVERS, CONCRETE

*Foote Co., Nunda, N. Y.

*Jaeger Mach. Co., Columbus, Ohio

*Kochring Co., Milwaukee
*Ransome Conc. Mchy. Co., Dunellen, N. J.

*T. L. Smith Co., Milwaukee
American Cem. Machy. Co., Keokuk, Ia.
Chain Belt Co., Milwaukee

PAVING AND BOAD ROLLERS (See Boad and

PAVING BLOCKS, CREOSOTED WOOD (See Creosoted Blocks)

PAVING BRICK

PAVING BRICK
Alton Brick Co., Alton, Ill.
Buckeye Shale Brick Co., Cleveland, Ohio
Buffalo Brick Co., Buffalo, Kans.
Cleveland Brick & Clay Co., Cleveland, Ohio
Collinwod Shale Brick Co., Cleveland, Ohio
Corry Brick & Tile Corp., Corry, Ps.
Crescent Brick Co., Pittaburgh, Ps.
Euclid Shale Brick Co., Cleveland, Ohio
Georgia Vit. Brick Co., Augusts, Gs.
Globe Brick Co., E. Liverpool, Ohio
Hammond Fire Brick Co., Fairmount, W. Vs.
Hisylvania Cosl Co., Columbus, Ohio
McAvoy Brick Co., Bridgeville, Ps.
Mayer Brick Co., Bridgeville, Ps.
Metropolis Paving Brick Co., Pittaburgh, Kans.
Metropolis Paving Brick Co., Murphysboro,
Mineral-Wells Brick Co., Murphysboro,
Murphysboro Paving Brick Co., Murphysboro,
Nelson Brick Co., Nelsonville, Ohio
Nelsonville Brick Co., Woberly, Mo.
Musphysboro Paving Brick Co., Murphysboro,
Paxton Clay Mfg. Co., Patton, Ps.
Psechlos Paving Brick Co., Fortsmouth, Ohio
Patton Clay Mfg. Co., Patton, Ps.
Psechlos Paving Brick Co., Galesburg, Ill.
Purington Paving Brick Co., Galesburg, Ill.

Ross Shale Brick Co., Veedersburg, Ill.
Rossell Clay Mfg. Co., Alton, Ala.
So. Clay Mfg., Chattanoga, Tenn.
Springfield Paving Brick, Springfield, Ill.
Sterling Brick Co., Olean, N. Y.
Streator Clay Mfg. Co., Streator, Ill.
Terra Haute Vit. Brick Co., Terre Haute, Ind.
Thornton Fire Brick Co., Clarksburg, W. Va.
Thurber Brick Co., Thurber, Tex.
Toronto Fire Clay Co., Toronto, Ohio
Trinidad Brick & Tile Co., Trinidad, Ohio
United Clay Products Co.p., Kansaw City
Western Shale Products Co.p., Ft. Scott, Kans.
Westport Paving Brick Co., Westport, Md.

PAVING MIXERS (See Concrete Mixers)

PAVING TOOLS

**Chausse Oil Burner Co., Elkhart, Ind.

**Connery & Co., Philadelphia, Pa.

**F. D. Cummer & Sons Co., Cleveland, Ohio

*Jos. Hohorst Co., Cincinnati, Ohio

*Littleford Bros. Co., Cincinnati, Ohio

*Littleford Bros. Co., Cincinnati, Ohio

*Lattleford Bros. Co., Philadelphia

Hauck Mfg. Co., Brooklyn, N. Y.

Warren Bros. Co., Boston

PICKS

IGKS
Hubbard Co., Pittsburgh
Iron Clty Tool Works, Pittsburgh
Klein-Logan Co., Pittsburgh
Oliver Iron & Steel Corp., Pittsburgh
Verons Tool Works, Verons, Pa.
Warren Tool & Forge Co., Warren. Ohio
Warwood Tool Co., Wheeling, W. Va.
Woming Shovel Works, Wyoming, Pa.

PILE DRIVERS *McKiernan-Terry Corp., N. Y. *Union Iron Works, Inc., Hoboken, N J. Harnischfeger Corp., Milwaukee Mead-Morrison Mfg. Co., East Boston Vulcan Iron Wks.; Chicago

PILE-HAMMERS, STEAM

*McKiernan-Terry Corp., N. Y. *Union Iren Works, Inc., Hoboken, N. J. Vulcan Iron Works, Chicago

PILING, CONCRETE

MacArthur Conc. Pile & F'd'n. Co., N. Y. Raymond Concrete Pile Co., N. Y.

PILING, INTERLOCKING STEEL

*Wemlinger, Inc., New York
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh

PILING, STEEL SHEET

*Wemlinger, Inc., New York Bethlehem Steel Co., Bethlehem, Pa.

PIPE, CAST IRON

**Sentral Foundry Co., N. Y.

**Central Foundry Co., Burlington, N. J.

**Am. Cast Iron Pipe Co., Birmingham, Ala.

J. B. Clow & Sons, Chicago

Donaldson Iron Co., Emaus, P.

John Fox & Co., New York

Glamorgan Pine & F'dry. Co., Lynchburg, Va.

Lynchburg F'dry. Co., Lynchburg, Va.

McWane Cast Iron Pipe Co., Birmingham, Ala.

National Cast Iron Pipe Co., N. Y.

R. D. Wood & Co., Philadelphia, Pa.

PIPE, CULVERT (See Culverts)

PIPE. LEAD

United Lead Company, N. Y.

PIPE, REINFORCED CONCRETE

*Newark Concrete Pipe Co., Newark, N. J. Concrete Products Co., Pittsburgh, Pa. Core Joint Concrete Pipe Co., Baltimore Independent Concrete Pipe Co., Indianapolis Lock Joint Pipe Co., Ampere, N. J.

PIPE. BIVETED STEEL OR IRON *Connery & Co., Inc., Philadelphia, Pa. *Jos. Honhorst Co., Cincinnati, O. *Littleford Bros., Cincinnati, O.

Abendroth & Root Mfg. Co., Newburgh, N. Y. Biggs Boiler Works, Akron Chattanooga Boiler & Tank Co., Chatta., Tenn. Chicago Bridge & Iron Works, Chicago East Jersey Pipe Co., N. Y. Hammond Iron Works, Warren, Pa. R. Hardesty Mfg. Co., Denver. Lancaster Iron Works, Lancaster, Pa., Petroleum Iron Wks. Co., Sharon, Pa. Pittsburgh-Des Moines Steel Co., Pittsb'h, Pa. Taylor Forge & Pipe Wks., Chicago Tippett & Wood, Phillipsburg, N. J. Weller Mfg. Co., Chicago

PIPE, STEEL

Central Tube Co., Pittsburgh, Pa.
Jones & Laughlin Steel Co., Pittsburgh
National Tube Co., Pittsburgh
Republic Iron & Steel Co., Youngstown, O.
South Chester Tube Co., Chester, Pa.
Spang-Chalfont & Co., Pittsburgh, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, WOOD

American Wood Pipe Co., Tacoma, Wash. Federal Tank & Pipe Co., Seattle, Wasn. Michigan Pipe Co., Bay City, Mich. Pacific Pipe & Tank Co., San Francisco Redwood Mfrs. Co., San Francisco Standard Wood Pipe Co., Williamsport, Pa. A. Wyckoff & Sons Co., Elmira, N. Y.

PIPE, WROUGHT IRON

A. M. Byers Co., Pittsburgh, Pa. Cohoes Rolling Mill Co., Cohoes, N. Y. Reading Iron Co., Reading, Pa.

PIPE BENDING MACHINES

American Pipe Bending Mach. Co., Boston Watson-Stillman Co., New York

PIPE COVERING

AIRCELL

**Philip Carey Co., Cincinnati, Ohio
Ehret Mag. Mfg. Co., Valley Forge, Pa.
Johns-Manville, Inc., N. Y.
Keasbey & Mattiaon Co., Ambler, Pa.
National Asbestos Co., Jersey City, N. J.
Norristown Mag. & Asb. Co., Norristown, Pa.
Sall Mountain Co., Chicago
H. F. Watson Co., Erie, Pa.

85 PER CENT MAGNESIA

*Philip Carey Ce., Cincinnati, Ohio Ehret Mag. Mfg. Co., Valley Forge, Pa. Johns-Manville, Inc., N. Y. Keazbey & Mattison Co., Ambler, Pa. Norristown Mag. & Asb. Co., Norristown, Pa.

WOOD

Redwood Mfrs. Co., San Francisco A. Wyckoff & Sons Co., Elmira, N. Y.

PIPE CUTTERS (See Cutters, Pipe, Head)

PIPE FITTINGS

*Central Foundry Co., N. Y.

*U. S. Pipe & Foundry Co., Burlington, N. J.

American Cast Iron Co., Birmingham, Ala.
Builders Iron Foundry, Providence, R. I.

J. B. Clow & Sons, Chicago

Crane Co., Chicago

Donaldson Iron Co., Emaus, Pa.

Lunkenheimer Co., Cincinnati, O.

Natl. C. I. Pipe Co., Birmingham, Ala

Reading Steel Casting Co., Inc., Bridgeport,

Con.

Warron Foundry & Pipe Co., N. V. Warren Foundry & Pipe Co., N. Y. R. D. Wood & Co., Philadelphia, Pa.

Taylor Portable Steel Derrick Co., Chicago

PIPE TAPPING MACHINERY (See Water Main Tapping)

PIPE PUSHERS

*Templeton, Kenly & Co., Chicage H. W. Clark Co., Mattoon, Ill. Duff-Norton Mfg. Co., Pittsburgh Easy Mfg. Co., Lincoln, Neb. Giant Mfg. Co., Council Bluffs, Ia.

PIPE THREADERS

Armstrong Mfg. Co., Bridgeport, Conn.

PLANERS, PNEUMATIC

Tousley Tool Co., Cleveland, Ohio





THREE CONTRACTORS' HELPERS that bring THREE KINDS OF SAVINGS:

Saving of man power Saving of time Saving in Equipment cost

FIRST "Our Leader," the WIARD 2-in-1 ROAD OR CONTRACTORS' PLOW:

Converted into a rooter plow simply by removing the steel point

wing. Used with either tractor or horse power. Lasts twice as long as the ordinary plow. One-man operated.

SECOND The WIARD GRADE-RIPPER, SCARIFIER or GANG-ROOTER:

When drawn by a large tractor, will rip gravel and macadam roads with ease.
Requires only a small tractor on light scarify-

ing operations. Has a ripping width of 48 inches.

Operated by one man who at all times sees the work.

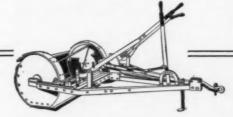
HIRD WIARD'S AUTOMATIC REVOLV-ING SCRAPER: THIRD

A 3-in-1 tool for excavating, grading and spreading.

Built stronger and heavier than the ordinary scraper, it will last indefinitely without buckling or breaking.

Both scraper and tractor are handled by one operator. Continuous forward motion when scraping, excavating or spreading. Will revolve backward against wall in cellar digging, and will slide backward to dump a load over an embankment.

WIARD PLOW COMPANY NEW YORK, BATAVIA,



WIARD'S GRADE

> WIARD'S AUTOMATIC REVOLVING SCRAPER

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Ind.
Chicago Gymnasinm Equipment Co., Chicago Everwear Mfg. Co., Springfield, O., Giant Mfg. Co., Council Bluffs, Ia.
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R. F. Lamar & Co., Pueblo, Colo.
Fred. Medart Mfg. Co., St. Louis, Mo.
Mitchell Mfg. Co., Milwaukee
Patterson-Williams Co., San Jose, Calif.
A. G. Spalding & Bros., Chicopee, Mass.

PLOWS, CONTRACTORS'

*Anstin-Western Road Mach. Co., Chicago

*Caterpillar Trac. Co., San Lesandre, Calif.

*General Wheelbarrow Co., Cleveland

*International Harvester Co., Chicago

*Wiard Plow Co., Batavia, N. Y.

J. D. Adams Co., Indianapolis, Ind.

American Steel Scraper Co., Sidney, O.

Deere & Co., Moline, Ill.

Gallon Iron Works & Mg. Co., Galion, O.

Moline Implement Co., Moline, Ill.

Oliver Farm Equip. Co., Senth Bend, Ind.

Ryan Mg. Corp., Chicago

Sidney Steel Scraper Co., Sidney, O.

Slusser-McLean Seraper Co., Sidney, O.

Western Wheeled Scraper Co., Aurora, Ill.

Western Waceled Scraper Co., Autors, In.

PLOWS, BOAD AND ROOTEE

*Austin-Western Boad Machinery Co., Chicago

*Caterpillar Tractor Co., San Leandro, Calif.

*General Wheelbarrow Co., Cleveland

*Wiard Plow Co., Batavia, N. Y.

Acme Road Machy. Co., Frankfort, N. Y.

J. D. Adams Co., Indianapolis

American Steel Scraper Co., Sidney, Ohio
Beach Mfg. Co., Charlotte, Mich.

Ted Carr & Co., Chicago
Deere & Co., Moline, Ill.

Galion Iron Works & Mfg. Co., Galion, Ohio
P. B. Hackley Equip. Co., San Francisco
Ryan Mfg. Corp., Chicago
Sidney Steel Scraper Co., Sidney, Ohio
Slusser-McLean Scraper Co., Sidney, Ohio
Western Wheeled Scraper Co., Aurora, Ill.

PLUMBING SUPPLIES
J. B. Clow & Sons, Chicago
Crane Co., Chicago
Glauber Brass Mg. Co., Cleveland, O.
J. L. Mott Iron Works, N. Y.
Mueller Company, Decatar, Ill.
Rundle-Spence Mg. Co., Milwaukee
Walworth Mg. Co., Boaton

PORTABLE BUILDINGS
*Blaw-Knox Co., Pittsburgh, Pa.
*Littleford Bros., Cincinnati, O.
*Truscon Steel Co., Youngstown, O.

PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)

PORTABLE WOOD WORKERS

*American Saw Mill Machinery Co., Hackettatown, N. J.
Jaeger Portable Power Corp., Detroit
Jones Superior Machine Co., Chicago

PORTLAND CEMENT (See Cement)

POTS, ASPHALT AND TAR, POURING *Littleford Bros., Cincinnati, Ohio Acme Road Machinery Co., Frankfort, N. Y. Barber Asphalt Co., Philadelphia Beach Manufacturing Co., Charlotte, Mich. Tarrant Mfg. Co., Saratoga Springs, N. Y.

POWER PLANTS, INDUSTRIAL

*Continental Motors Corp., Muskegon, Mich.
*Hercules Motors Corp., Canton, O.
*John Lausen Mg. Co., New Holstein, Wis.
*Is Roi Co., Milwaukee

*Sanderson-Cyclone Drill Co., Orrville, O.
*Wankesha Motor Co., Milwaukee, Wis.
*Buda Co., Harvey, Ill.
Climax Engine Co., Clinton, Jowa
Fuller & Johnson Mfg. Co., Madison, Wis.
Hinkley Motors, Inc., Detroit
Servel Mfg. Co., Evansville, Ind.

PULLING MACHINES

*Beebe Bros., Inc., Seattle, Wash.

*Clyde Iron Works Sales Co., Duluth, Minn.

John Waldron Corp., New Brunswick, N. J.

PUMPS, AIR LIFT FUMPS, AIR LIFT
*Sullivan Machinery Co., Chicago
American Steam Pump Co., Battle Creek, Mich.
Chicago Pneumatic Tool Co., New York
Gardner-Denver Co., Quincy, Ill.
Indiana Pump & Compr. Co., Indianapolis
Ingersoll-Rand Co., New York PUMPS, CENTRIFUGAL

PUMPS, CENTRIPUGAL

*Allis-Chalmers Mfg. Co., Milwaukee,

*C. H. & E. Mfg. Co., Milwaukee, Wis.

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Homelite Corp., Fort Chester, N. Y.

*Jaeger Mach. Co., Columbus, O.

*John Lauson Mfg. Co., New Holstein, Wis.

*La Bour Co., Inc., Elkhart, Ind.

*Novo Engine Co., Lansing, Mich.

Aldrich Pump Co., Allentown, Pa.

American Steam Pump Co., Battle Creek, Mich.

American Steam Pump Co., Buffalo, N. Y.

As. Cameron Steam Pump Co., Buffalo, N. Y.

A. S. Cameron Steam Pump Works, New York

Chain Belt Co., Milwaukee

Chicago Pump Co., Chicago

Cook Motor Co., Delsware, O.

Dayton-Dowd Co., Quiney, Ill.

Dean Hill Pump Co., Anderson, Ind.

De Laval Steam Turbine Co., Trenton, N. J.

Deming Co., Salem, O.

Erie Fump & Engine Works, Medina, N. Y.

Evinrude Div., Outboard Motors Corp., Mil
waukee

Fairbanks, Morse & Co., Chicago Erie Pump & Engine Works, Medina, N. Y.
Evinrade Div., Outboard Motors Corp., Milwaukee
Fairbanks, Morse & Co., Chicago
General Electric Co., Schenectady
Goulds Pumps, Inc., Sences Falls, N. Y.
Humphryses Mfg. Co., Mansfield, Ohio
Indiana Pump & Compr. Co., Indianapolis
Ingersoll-Rand Co., New York
Keystons Driller Co., Beaver Falls, Pa.
LeCourtenay Co., Newark, N. J.
Manistee Iron Works, Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.
Rumsey Pump Co., Sences Falls, N. Y.
Trench & Marine Pump Co., New York
United Iron Works, Inc., Kansas City, Mo.
Warren Steam Fump Co., Warren, Mass.
Weinman Pump Mfg. Co., Columbus, O.
Wheeler Condenser & Eng. Co., Carteret, N. J.
Worthington Pump & Machinery Corp., N. Y.

*Allis-Chalmers Mfg. Co., Milwaukee
*Ralph B. Carter Co., New York
*C. H. & E. Mfg. Co., Milwaukee
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Josept Machine Co., Columbus, O.
*John Lauson Mfg. Co., Mew Holstein, Wis.
*Novo Engine Co., Lanning, Mich.
*Tool & Device Corp., Waterford, N. T.
*Union Iron Works, Hoboken, N. J.
*Waukesha Motor Co., Waukesha, Wis.
Aldrich Pump Co., Allentown, Pa.
American Steam Pump Co., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Barnes Mfg. Co., Mansfield, Ohio
Buda Co., Harvey, Ill.
A. S. Cameron Steam Pump Works, New York
Chain Belt Co., Milwaukee
Construction Machinery Co., Waterloo, Iowa
Dayton-Dowd Co., Quincy, Ill.
Deming Co., Salem. O.
Emorson Fump & Valve Co., Alexandria, Va.
Erie Pump & Engine Works, Medina, N. Y.
Evinrade Div., Outboard Motors Corp., Milwaukee
Fairbanks, Morse & Co., Chicago PUMPS, CONTRACTORS' Evis rump e Div., Outboard Motors Corp., Milwaukee
Fairbanks, Morse & Co., Chicago
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, New York
Humphreys Mg. Co., Mannfield, Ohio
Ingersoil-Rand Co., New York
Jaeger Portable Power Corp., Detroit
Kinney Mg. Co., Boston
LeCourtenay Co., Newark, N. J.
Morris Machine Works, Baldwinaville, N. Y.
F. E. Myers & Bros. Co., Ashland, O.
Pulsometer Steam Pump Co., New York
Rumsey Pump Co., Seneca Falls, N. Y.
Standard Scale & Supply Corp., Pittsburgh
Trench & Marine Pump Co., New York
Van Nouhuys Machine Works, Albany, N. Y.
Waldo Bros. & Bond Co., Boston, Mass.

PUMPS, DEEP WELL

PUMPS, DEEP WELL

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Nove Engine Co., Lansing, Mich.

Alamo Eng. Co., Hilladale, Mich.

Aldrich Pump Co., Allentown, Pa.

American Steam Pump Co., Battle Creek, Mich.

American Well Works, Aurors, II.

Barnes Mig. Co., Mansfield, O.

A. S. Cameron Steam Pump Works, New York

A. D. Cook, Inc., Lawrenceburg, Ind.

Dean Hill Pump Co., Anderson, Ind.

Deming Co., Salem, O.

Gardner-Denver Co., Quincy, III.

Goulds Pumps, Inc., Sencea Falls, N. Y.

Humphryes Mig. Co., Mansfield, Ohio

Indiana Pump & Compr. Co., Indianapolis

Ingersoll-Rand Co., New York

Keystone Driller Co., Beaver Falls, Pa.

Layne & Bowler, Inc., Memphis, Tenn.
A. Y. McDonald Mfg. Co., Dubuque, Iowa
F. E. Myers & Bros. Co., Ashland, O.
Rumsey Pump Co., Seneca Falls, N. Y.
Trench & Marine Pump Co., New York
United Iron Works, Inc., Kansas City, M
Weinman Pump Mfg. Co., Columbus, O.

PUMPS, DIAPHRAGM

PUMPS, DIAPHRAGM

*C. H. & E. Mig. Co., Milwaukee

*Ralph B. Carter Co., New York

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Novo Engine Co., Lausing, Mich.

Barnes Mfg. Co., Mansfield, O.

Chain Belt Co., Milwaukee, Wis.

Construction Machinery Co., Waterloo, Ia.

Deming Co., Salem, Ohio

Dorr Co., New York

Goulds Pumps, Inc., Seneca Falls, N. Y.

Humphreys Mfg. Co., Mansfield, Ohio

Trench & Marine Pump Co., New York

Waldo Bros. & Bond Co., Boston, Mass.

Witte Engine Works, Kansas City, Mo.

PUMPS, DREDGING Ellicott Machinery Corp., Baltimore, Md. Erie Pump & Engine Wks., Medina, N, Y. Morris Machine Works, Baldwinsville, N. Y. Trench & Marine Pump Co., New York

PUMPS, GASOLINE AND OIL S. F. Bower & Co., Inc., Ft. Wayne, Ind. Gilbert & Barker Mfg. Co., Springfield, Mass. Ingersoil-Rand Co., New York Kinney Mfg. Co., Boston Tokheim Oil Tank & Pump Co., Ft. Wayne, Wayne Tank & Pump Co., Ft. Wayne, Ind.

PUMPS, PORTABLE **C. H. & E. Mfg. Co., Milwaukee, Wis.
**Homelite Corp., Port Chester, N. Y.
**Jaeger Machine Co., Columbus, O.
**John Lauson Mfg. Co., New Holstein, Wis.
**Union Iron Works, Hoboken, N. J.
**American Steam Pump Co., Battle Creek, Mich.
Evinrude Div., Outboard Motors Corp., Milwankee waukee Humphreys Mfg. Co., Mansfield, Ohio Jaeger Portable Power Corp., Detroit Trench & Marine Pump Co., New York

PUMPS, POWEB

*Allis-Chalmers Mfg. Co., Milwaukee

*C. H. & E. Mfg. Co., Milwaukee, Wis.

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Homelite Corp., Port Chester, M. Y.

*Jaeger Mach. Co., Columbus, O.

*Novo Engine Co., Lanning, Mich.

*Waukesha Motor Co., Waukesha, Wis.

Alamo Iron Works, San Antonio, Texas

Aldrich Pump Co., Allentown, Pa.

American Steam Pump Co., Battle Creek, Mich.

American Well Works, Aurora, Ill.

Barnes Mfg. Co., Mansfield, U

Chicago Pump Co., Chicago

Dayton, Dowd Co., Quiney, Ill.

Dean Bros. Co., Indianapolis

De Laval Steam Turbine Co., Trenton, N. J.

Deming Co., Salem, O.,

Evinrude Div., Outboard Motors Corp., Milwaukee PUMPS, POWER Evinrude Div., Outboard Motors Corp., Milwaukee
Fairbanks, Morse & Co., Chicago
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Senecs Falls, N. Y.
Hunphreys Mfg. Co., Manafield, Ohio
Indiana Pump & Compr. Co., Indianapolis
Ingersoll-Rand Co., New York
Kinney Mfg. Co., Boston
Lawrence Machinery Co., Lawrence, Mass.
LeCourtenay Co., Newark, N. J.
F. E. Myers & Bros. Co., Ashland, O.
Northern Pump Co., Minneapolis
Rumsey Pump Co., Seneca Falls, N. Y.
Trench & Marine Pump Co., New York
Weinman Pump Mfg. Co., Columbus, O.
Worthington Pump & Machinery Corp., N. Y
Yeomans Bros. Co., Chicago

PUMPS, SEWAGE PUMPS, SEWAGE

°C. H. & E. Mfg. Co., Milwaukee, Wis.

°Jasger Mach. Co., Columbus, O.

°Novo Engine Co., Lansing, Mich.
American Steam Pump Co., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.

A. S. Cameron Steam Pump Works, New York
Chicago Pump Co., Chicago
Fairbanks, Morse & Co., Chicago
Humphreya Mfg Co., Mansfield, Ohio
Ingersoil-Rand Co., New York
Pacific Flush Tank Co., Chicago and N. Y.
Warren Steam Pump Co., Warren, Mass.
Yeomans Bros. Co., Chicago

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Not with the idea of hanging up a new record, but merely in the course of the day's work, this Novo 62-C Diaphragm Pump used by Louis Samson, Blue Island, Illinois, operated continuously for 470 hours, And when the outfit was shut down, both the pump and the engine were in good condition. A still greater record undoubtedly would have been made if the job had required more time.

Such flawless performance day after day – week after week – is typical of the kind of service Novo Diaphragm Pumps give.

And back of such service are the inevitable low costs that follow such trouble-free operation.

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Dewatering with 44 points for a 21' x 37' excavation, this 62-C Novo Diaphragm Pump operated 470 hours without a stop. The excavation was in the middle of a slough consisting of muck and sand held in suspension by the water. One of the interesting things about the job was that every morning the Public Service Co. used to pump out their manhole so the men could work in the tunnel. Two days after the Novo pump was started, every manhole within a block of the job was as dry as a bone. Write for the Novo Pumping Handbook.

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PUMPS, TAR AND ASPHALT
*Littleford Bros., Cincinnati
Barber Asphalt Co., Philadelphia, Ps.
Kinney Mig. Co., Boston

PUNCHES AND DIES, STEEL Cleveland Steel Tool Co., Cleveland, O.

RADIATORS FOR GASOLINE ENGINES
McCord Radiator Mfg. Co., Detroit
Modine Mfg. Co., Racine, Wis.
Racine Radiator Co., Racine, Wis.
Young Radiator Co., Racine, Wis.

RAIL AND RAIL JOINTS

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Koppel Ind. Car & Equipment Co., Koppel, Pa.
Sweet's Steel Co., Williamsport, Pa.
W. A. Zelnicker Supply Co., St. Louis, Mo.

RAILROAD DITCHERS (See Excavators, Ditch and Trench)

REINFORCING CONCRETE (See Concrete Reinforcement)

RINGS AND BANDS FOR CONCRETE MIXERS AND BOAD MACHINERY
*American Welding & Mfg. Co., Warren, O.

RIVETERS, PNEUMATIC

The Bubi Company, Chicage
Independent Pneu. Tool Co., Chicage
Chicago Pneumatic Tool Co., New York
Cleveland Pneumatic Tool Co., Cleveland, O.
Hanna Engineering Works, Chicago
Helwig Mfg. Co., St. Paul. Minn.
Ingersoll-Rand Co., New York
Wm. H. Keller, Inc., Grand Haven, Mich.
Southwark Foundry & Machine Co., Phila.
Watson-Stillman Co., New York

RIVET SETS IVET SETS
*Independent Pneu. Tool Co., Chicago
Chicago Pneumatic Tool Co., New York
Cleveland Pneumatic Tool Co., Cleveland, O.
Cleveland Steel Tool Co., Cleveland, O.
Ingersoll-Rand Co., New York

BOAD GRADERS, HORSE OR TRACTOR
DRAWN

*Austin-Western Read Machy. Co., Chicage
'Caterpillar Tractor Co., San Leendro, Cal.

*W. A. Riddell Co., Bucyrns, O.

*Bome Mg. Co., Rome, N. Y.

*Gustav Schsefer Co., Cleveland

*Morits & Bennett Corp., Effingham, Ill.
Acme Road Machy. Co., Frankfort, N. Y.

J. D. Adams Co., Indianapolis, Ind.
Austin Mfg. Co., Chicago
Banting Mfg. Co., Toledo, O.
Beach Mfg. Co., Charlotte, Mich.
Galion Iron Works & Mfg. Co., Gallon, O.
Gilbert Mfg. Co., Aberdeen, S. D.

Killefer Mfg. Co., Los Angeles
Klauer Mfg. Co., Dubuque. Iowa
N. S. Monroe & Sons, Arthur, Ill.
New England Road Machy. Co., Se. Boston,
Mass.
Owensboro Ditcher & Grader Co., Owensboro. New Mass. Owensboro Ditcher & Grader Co., Owensboro,

Ky.

Ryan Mfg. Corp., Chicago

Spears-Wells Machinery Co., Oakland, Cal.
Stockland Road Machinery Co., Minneapoli
Western Wheeled Scraper Co., Aurors, Ill.

BOAD GRADERS, POWER

*Austin-Western Road Mach. Co., Chicage
Caterpillar Tractor Co., San Leandro, Cal.
Clieveland Tractor Co. Civeveland
Glood Reads Machinery Co., Kennett Sq., Pa.
*Mome Mfg. Co., Rome, N. Y.

*W. A. Riddell Co., Bucyrus, O.
Acme Road Machinery Co., Frankfort, N. Y.
J. D. Adams Co., Indianapolis
Bates Mfg. Co., Joliet, Ill.
Beach Mfg. Co., Charlotte, Mich.
Galion Iron Works & Mfg. Co., Galion, O.
Gilbert Mfg. Co., Aberdeen. S. D.
Landreth Machinery Co., Joplin, Mo.
Spears-Wells Machinery Co., Oakland, Cal.
Wehr Co., Milwaukee

BOAD MAINTAINERS, POWER

*Baker Mfg. Co., Springfield, Ill.
*Coterpillar Tractor Co., San Leandro, Cal.
*Cleveland Tractor Co., Cleveland
*Good Roads Machinery Co., Kennett Sq., Pa.
*Rome Mfg. Co., Rome, N. Y.
J. D. Adams Co., Indianapolis
Galion Iron Works & Mfg. Co., Galion, Ohio
Landreth Machinery Co., Joplin, Mo.
Ryan Mfg. Corp., Chicago
Spears-Wells Machinery Co., Oakland, Câl.
Stockland Road Machinery Co., Minneapolis

ROAD OILS (See Oils, Road)

ROAD OILERS ROAD OILERS

*Austin-Western Read Machy. Co., Chicage

*E. D. Etnyre & Co., Oregon, Ill.

*Good Roads Machy. Co., Kennett Sq., Pa.

*Chas. Hoxas & Co., New York

*White Co., Cieveland

Kinney Mfg. Co., Boaton

Mack Trucks, Inc., New York

Municipal Supply Co., South Bend, Ind.

Spears-Wells Machinery Co., Oakland, Cal.

ROCK CRUSHERS AND PULVERIZERS (See

ROCK DRILLS (See Drills, Rock)

ROLLERS, EMBANKMENT *Buffalo-Springfield Roller Co., Springfield, O. Acme Road Machy. Co., Frankfort, N. Y. H. W. Rohl & Co., Los Angeles, Calif.

ROLLERS, ROAD AND PAVING

*Ames Iron Works, Oswego, N. Y.

*Austin-Western Road Machy. Co., Chicago

*Buffalo-Springfield Roller Co., Springfield, O.

*Good Roads Machinery Co., Kennett Sq., Pa.

*Huber Mg. Co., Marion, Ohio

*W. A. Riddell Co., Bucyrus, O.

Acme Road Machinery Co., Frankfort, N. Y.

Austin Mg. Co., Chicago

Banting Mfg. Co., Chicago

Banting Mfg. Co., Chicago

Banting Mfg. Co., Chiladelphia

Beach Mfg. Co., Charlotte, Mich.

Erie Machine Shope. Erie, Pa.

Galion Iron Works & Mfg. Co., Galion, O.

Horst & Strieter Co., Davenport, Iowa

Kinney Standards, Inc., Brooklyn, N. Y.

Wehr Co., Milwaukee ROLLERS, ROAD AND PAVING

ROOFING, ASBESTOS, ASPHALT, COMPOSI-TION, TILE, METAL, ETC. TION, TILE, METAL, ETC.

*Philip Carey Co., Cincinnati, O.

*Standard Oil Co. (Indiana), Chicago

*Truscon Steel Co., Youngstewn, C.
American Cement Tile Mfg. Co., Pittsburgh
Atlantic Refining Co., Inc., Phila., Ps.
Barber Asphalt Co., Philadelphia, Ps.
Bird & Son, Inc., East Walpole, Mass.
Certain-teed Products Corp., New York
Chatfield Mfg. Co., Cincinnati, O.
Decatur Cornice & Roofing Co., Albany, Ala.
Edwards Mfg. Co., Cincinnati, O.
Flintkote Co., Boston
Intl. Comb. Tar & Chem. Corp., New York
Keystone Roofing Mfg. Co., York, Ps.
The Lehon Co., Chicago
National Roofing Co., Tonawands, N. Y.
National Sheet Metal Roofing Co., Jerey City,
N. J. N. J. W. F. Norman Sheet Metal Mfg. Co., Nevada, Mo. Mo.
Ruberoid Co., New York
Sall Mountain Co., Chicago
Sifo Products Co., St. Paul, Minn.
L. Sonneborn & Sons, Inc., New York
Texas Co., New York
Western Elaterite Roofing Co., Denver

ROOFING KETTLES (See Kettles)

ROPE, MANILA

OPE, MANILA

American Mfg. Co., Brooklyn, N. Y.
Columbian Rope Co., Auburn, N. Y.
Cupples Cordage Co., Brooklyn, N. Y.
Hooven & Allison Co., Xenia, O.
R. A. Kelly Co., Xenia, O.
R. A. Kelly Co., Xenia, O.
N. Bedford Cordage Co., N. Bedford, Mass.
Peoria Cordage Co., Peoria, III.
Plymouth Cordage Co., N. Plymouth, Mass.
Portland Cordage Go., Nelymouth, Mass.
Portland Cordage Mills, St. Louis, Mo.
Tubbs Cordage Co., San Francisco
Wall Rope Works, New York
Waterbury Co., New York
Whitlock Cordage Co., New York

ROPE, WIRE, HOISTING, HAULAGE ROPE, WIRE, HOISTING, HAULAGE

*American Steel & Wire Co., Chicago

*Williamsport Wire Rope Co., Wilkamsport, Pa.

American Cable Co., Inc., New York

Broderick & Bascom Rope Co., St. Louis, Mo.

Fischer & Hayes Rope & Steel Co., Chicago

L. P. Green, Chicago

Hasard Wire Rope Co., Wilkes-Barre, Pa.

A. Leschen & Sons Rope Co., St. Louis

Macwhyte Co., Kenosha, Wis.

Page Steel & Wire Co., Bridgeport, Conn.

J. A. Roebling's Sons Co., Trentos, N. J.

Upson-Walton Co., Cleveland, Ohio

Wickwire Spencer Steel Co., New York

RUBBER TIRES (See Tires)

SALAMANDERS, OIL BURNING *Littleford Brothers, Cincinnati, Ohie Aeroil Burner Co., West New York, N. J. Anchor Mfg. Co., Chicago Hauck Mfg. Co., Brooklyn, N. Y. Macleod Co., Cincinnati

SALAMANDERS, COKE OR WOOD BURNING *General Wheelbarrow Co., Cleveland, Oh *Joseph Hornhorst Co., Cincinnati, Ohie *Littleford Brothers, Cincinnati, Ohio Jackson Mfg. Co., Harrisburg

SAFETY TREADS (See Treads, Safety)

SASH ROLLER STEEL (See Window Frames and Sash)

Cleveland Steel Specialty Corp., Cleveland, O.

SAW MILLS & ACCESSORIES *American Saw Mill Machy. Co., Hackettstown,

SAW RIGS, PORTABLE SAW RIGS, FORTABLE

'American Saw Mill Machy. Co., Hackettstown,
N. J.

'C. H. & E. Mfg. Co., Milwaukee

'John Lauson Mfg. Co., New Holstein, Wis.
De Walt Products Co., Leola, Pa.
Jones Superior Machine Co., Chicago
Knickerbocker Co., Jackson, Mich.
Leach Co., Oshkosh, Wis.

Witte Engine Works, Kansas City, Mo.

SAWS, PORTABLE POWER AWS, PORTABLE POWER

*Reed-Prentice Corp., Worcester, Mass.
Ingersoll-Rand Co., New York
Michel Electric Hand Saw Co., Chicago
Portable Power Tool Corp., Warsaw, Ind.
Porter Cable Machinery Co., Syracuse
F. L. Rogers & Co., Chicago
Skilsaw, Inc., Chicago, Ill.
Speedway Mfg. Co., Cicero, Ill.
Tousley Tool Co., Cleveland, Ohio
Wappat Gear Works, Pittsburgh, Pa.
Witte Engine Works, Kansas City, Mo.

SCARIFIERS **SCARIFIERS**

*Austin-Western Road Machy. Co., Chicago
**Baker Mfg. Co., Springfield, Ill.
**Buffalo-Springfield Roller Co., Springfield, O.
**Caterpillar Tractor Co., San Leandro, Cal.
**Huber Mfg. Co., Marion, Ohio
**Chas. Hvass & Co., New York
**Bome Mfg. Co., Rome, N. Y.
**Wiard Plow Co., Batavia, N. Y.
**Acme Road Machinery Co., Frankfort, N. Y.
**Acme Road Machinery Co., Frankfort, N. Y.
**Acme Road Machinery Co., Frankfort, N. Y.
**Acme Road Machinery Co., Galion, O.
**Killefer Mfg. Co., Toledo, Ohio
**Galion Iron Works & Mfg. Co., Galion, O.
**Killefer Mfg. Corp., Los Angeles
**Klauer Mfg. Co., Dubuque, Iowa
**Ryan Mfg. Corp., Chicago
**Universal Road Machy. Co., Kingston, N. Y.

SCARIFIERS, TEETH FOR *Caterpillar Tractor Co., San Leandre, Cal. *Shunk Mfg. Co., Bucyrus, Ohio Galion Iron Works & Mfg. Co., Galion, Ohio

SCOOPS, HORSE OR TRACTOR DRAWN (See Scrapers Drag, Scrapers, Rotary and Scrapers, Wheeled)

SCOOPS, HAND (See Shovels, Spades and

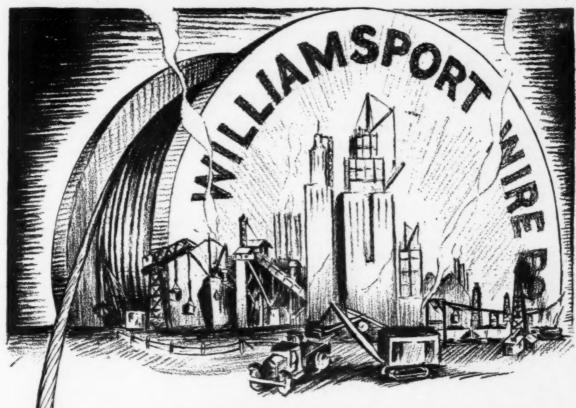
SCOOPS, SKIMMER AND TRENCH *Bay City Shovels, Inc., Bay City, Mich. Keystone Driller Co., Beaver Falls, Pa.

SCRAPERS, FRESNO (See Scrapers, Rotary)

SCRAPERS, DRAGLINE **GRATERS, DRAGLINE

*Garst Mrg. Company, Chicage

*Sauerman Bros., Chicago
American Manganese Steel Co., Chicago
Heights, Ill.
Beach Mrg. Co., Charlotte, Mich.
Browning Crane Co., Cleveland
Bucyrus-Eric Co., Eric, Pa.
Harnischfeger Corp., Milwaukee.
Link-Belt Co., Chicago
Monighan Machine Co., Chicago
Page Engineering Co., Chicago



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SCRAPERS, POWER DRAG **GRAFERS, POWER DRAG**

*Garst Mfg. Co., Chicago

*Highway Trailer Co., Edgerton, Wis.

*W. A. Riddell Co., Bucyrus, Ohio

*Sanerman Bros., Chicago

*Schofield-Burkett Constr. Co., Macon, Ga.
Beach Mfg. Co., Charlotte, Mich.
Beaumont Mfg. Co., Philadelphia
L. P. Green, Chicago

SCRAPERS, ROAD (See also Drags, Road) *Rome Mfg. Co., Bome, N. Y. Root Spring Scraper Co., Kalamazoo, Mich.

*Austin-Western Road Machinery Ce., Chicago
*Baker Mg. Co., Springfield, III.
*Euclid Crane & Hoist Co., Euclid Village, O.
*Rederick Lean Co., Mansfield, Ohio
*Gustav Schaefer Ce., Cleveland, Ohio
*Wiard Plow Ce., Batavia, N. Y.
J. D. Adams Co., Indianapolie, Ind.
American Steel Scraper Co., Sidney, Ohio
Atlas Scraper Co., Los Angeles, Calif.
Beach Mfg. Co., Charlotte, Mich.
Case Crane & Eng. Co., Columbus, Ohio
Galion Iron Works & Mfg. Co., Galion, O.
Goneral Wheelbarrow Co., Cleveland, Ohio
Kilefer Mfg. Corp., Los Angeles
Miskin Scraper Works Co., Ucon, Idaho
Root Spring Scraper Co., Kalamsnoo
Ryan Mfg. Corp., Chicago
H. C. Shaw Co., Stockton, Calif.
Slusser-McLean Scraper Co., Sidney, Ohio
Solano Iron Works, Berkeley, Calif.
Stockland Road Machy, Co., Minneapolis, Minn,
Western Wheeled Scraper Co., Aurora, III. SCRAPERS, ROTARY

SCRAPERS, SELP-LOADING (See Scrapers, Rotary and Scrapers, Wheeled)

**Austin-Western Road Machinery Co., Chicago **Austin-Western Road Machinery Co., Chicago **Baker Mig. Co., Springfield, Ill. **Euclid Crane & Hoist Co., Euclid Village, O. **General Wheelbarrow Co., Cleveland **W. A. Eiddell Ce., Bucyrua, Ohio Acme Road Machy. Co., Frankfort, N. Y. J. D. Adams Co., Indianapolis, Ind. American Steel Scraper Co., Sidney, Ohio Atlas Scraper Co., Los Angeles, Calif. Beach Mig. Co., Charlotte, Mich. Case Grane & Eng. Co., Columbus, Ohio Galion Iron Works & Mig. Co., Galion, Ohio Miskin Scraper Was., Ucon, Idaho Ryan Mig. Corp., Chicago Sidney Steel Scraper Co., Sidney, Ohio Slusser-McLean Scraper Co., Sidney, Ohio H. C. Shaw Co., Stockton, Calif. Stockland Road Machy. Co., Minneapolis, Minn. Western Wheeled Scraper Co., Aurora, Ill. SCRAPERS, WHEELED

**SCREENS, SAND, GRAVEL AND COAL

*Allis-Chalmers Mfg. Co., Milwaukee

*Austin-Western Road Machinery Co., Chicago

*Chicago Automatic Conv. Co., Chicago

*Good Roads Machinery Co., Kennett Sq., Pa.

*Littleford Bres., Cincinnati, Ohio
Acme Road Machinery Co., Frankfort, N. Y.

Atlas Engineering Co., Milwaukee, Wis.

Austin Mfg. Co., Chicago
C. O. Bartlett & Snow Co., Cleveland, Ohio
Beach Mfg. Co., Charlotte, Mich.

Deister Concentrator Co., Ft. Wayne, Ind.

Galion Iron Works & Mfg. Co., Galion, Ohio
Gifford-Wood Co., Hudson, N. Y.

L. P. Green, Chicago
Geo. Haiss Mfg. Co., New York

Hendrick Mfg. Co., Carbondale, Ohio
Jeffrey Mfg. Co., Columbus, Ohio
Link-Belt Co., Ohicago

Morrow Mfg. Co., Wellston, Ohio
Newayo Engineering Co., Newsgo. Mich.

New Holland Mach. Co., New Holland. Pa.

New Jersey Wire Cloth Co., Trenton, N. J.

Robins Conv. Belt Co., New York

H. B. Sackett Screen & Chute Co., Chicago
Smith Engineering Works, Milwaukee, Wir.

Universal Crasher Co., Cedar Rapids, Iowa
Universal Road Machine Co., Kingston, N. Y.

Webster Mfg. Co., Chicago

Weller Mfg. Co., Chicago

Wilchwire Spencer Steel Co., New York SCREENS, SAND, GRAVEL AND COAL

SCREENS, SEWAGE Dorr Co., New York Green Bay Fdry. & Mach. Wks., Green Bay, Wis, Link-Belt Co., Chicago Simplex Ejector & Aerator Corp., Chicago

SEWAGE DISINFECTION *Wallace & Tiernan Ce., Inc., Newark, N. J. Paradon Mfg. Co., Arlington, N. J. SEWAGE DISPOSAL APPARATUS Dorr Co., New York Link-Belt Co., Chicago Pacific Flush Tank Co., Chicago and N. Y. Simplex Ejector & Aerator Corp., Chicago

SEWAGE EJECTORS

Pacific Flush Tank Co., Chicago and N. Y. Simplex Ejector & Aerator Corp., Chicago Yeomans Bros. Co., Chicago SEWAGE PUMPS (See Pumps)

SEWER BRACES

SEWER BLOCKS, SEGMENT EWEE BLOCKES, SEGMENT
American Vit. Products Co., Akron, Ohio
Cannelton Sewer Pipe Co., Cannelton, Ind.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., Kaneas City, Mo.
Evens & Howard Fire Brick Co., St. Louis, Mo.
Laclede Christy Clay Prod. Co., St. Louis, Mo.
Macomb Sewer Pipe Works, Macomb, Ill.
Pacific Clay Products Co., Los Angeles, Cal.
Red Wing Sewer Pipe Co., Red Wing, Minn.
Robinson Clay Products Co., Akron, Ohio
Standard Fire Brick & Sewer Pipe Co., Pueblo,
Col.

*Templeton, Kenly & Co., Chicago SEWER CLEANING APPARATUS Champion Corp., Hammond, Ind.
Hepeo Sewer Root Cutter Co., Freeport, Ill.
Self Propelling Nozsle Co., New York
Turbine Sewer Machine Co., Milwaukee
Westinghouse Elec. Sup. Co., F. Bissell Div.,
Toledo

SEWER PIPE AND DRAINS **SEWEH PIPE AND DRAINS

*Armco Culvert Mfrs. Assn., Middletown, Ohio American Vit. Products Co., Akron, Ohio Blackmer & Fost Pipe Co., St. Louis

William E. Dee Co., Chicago
Denver Sewer Pipe & Clay Co., Denver. Colo.

W. S. Dickey Clay Mfg. Co., Kanass City, Mo. Evens & Howard Fire Brick Co., St. Louis
Logan Clay Products Co., Logan, Ohio Ohio Vit. Pipe Co., Uhrichaville, Ohio
Patton Clay Mfg. Co., Patton, Pa.

Red Wing Sewer Pipe Co., Red Wing. Minn.

Robinson Clay Prod. Co., Akron, Ohio
Streator Clay Mfg. Co., Streator, Ill.

SEWER PIPE FORMS (See Forms, Concrete

SEWER PIPE JOINT COMPOUNDS Atlas Mineral Prod. Co., Mertztown, Pa Pacific Flush Tank Co., Chicago and N. Ruberoid Co., New York Servicised Products Corp., Chicago Presstite Engg. Co., St. Louis. Quinn Wire & Iron Works, Boone, Iowa

Champion Corp., Hammond, Ind. Turbine Sewer Machine Co., Milwankee Westinghouse Elec. Sup. Co., F. Bissell Div., Toledo

SHARPENERS, DRILL STEEL *Sullivan Machinery Co., Chicago Gardner-Denver Co., Quincy, Ill. Hardaocg Wonder Drill Co., Ottumwa, Iowa Ingersoll-Rand Co., New York

Cleveland Wheelbarrow Co., Cleveland Concrete Engineering Co., Omaha, Neb. Dayton Sure Grip & Shore Co., Dayton, Ohio Fischer & Hayes Rope & Steel Co., Chicago M. & M. Wire Clamp Co., Minneapolis The O. D. G. Co., Owensboro. Fy. H. W. Roos Co., Cincinnati, Ohio Roos-Meyer-Heeht Co, Cincinnati, Ohio Symons Clamp & Mfg. Co., Chicago Universal Form Clamp Co., Chicago

SHOULDER FINISHING MACHINES *Moritz-Bennett Corp., Effingham, Ill.

SHOVELS, CRAWLER TRACTOR

*General Excavator Co., Marion, Ohio *Industrial Brownhoist Corp., Cleveland *Manitowoc Engs. Wks., Manitowoc, Wis *Thew Shovel Co., Lorain, Ohio *Trackson Co., Milwaukee *Universal Crans Co., Lorain, O. American Hoist & Derrick Co., St. Paul

Browning Orane Co., Cleveland Bucyrus-Erie Co., Erie, Pa. Harniachfeger Corp., Milwaukee Northwest Engg. Wks., Chicago Ohio Power Shovel Co., Lima, O. Speeder Mchy. Corp., Cedar Rapids, Iowa

SHOVELS, ELECTRIC **BAY City Shovels, Inc., Bay City, Mich.
**General Excavator Co., Marion, O.
**Industrial Brownhoist Corp., Cleveland
**Koehring Co., Milwaukee, Wis.
**Manitowoc Engg. Wks., Manitowoc, Wis.
**Oagoed Company, Marion, Ohio
**Thew Shovel Co., Lorain, Ohio
American Hoist & Derrick Co., St. Paul
Bucyrus-Eric Co., Eric, Pa.
Byers Mach. Co., Ravenna, Ohio
Harnischfeger Corp., Milwaukee
Link-Belt Co., Chicago
Marion Steam Shovel Co., Marion, Ohio
Northwest Engg. Wks., Chicago
Ohio Power Shovel Co., Lima, O.
Speeder Mchy, Corp., Cedar Rapids, Iowa

SHOVELS, GASOLINE

*Bay City Shovels, Inc., Pay City, Mich.

*General Excavator Co., Marion, Ohio

*Industrial Brownhoist Corp., Cleveland

*Innley Mfg. Co., Indianapolis

*Koehring Co., Miwaukee, Wis.

*Manitowoc Engs. Wks., Manitowoc, Wis.

*Osgood Company, Marion, Ohio

*Trackson Co., Miwaukee

American Hoist & Derrick Co., St. Paul

Bucyrus-Eric Co., Erie, Pa.

Byerz Mach. Co., Erie, Pa.

Byerz Mach. Co., Ravenna, Ohio

*Harnischfeger Corp., Milwaukee Wis.

Keystone Driller Co., Beaver Falls, Pa.

Link-Belt Co., Chicago

Marion Steam Shovel Co., Marion, Ohio

McMyler Intervate Co., Cleveland, Ohio

Mead-Morrison Mfg. Co., Boston

Northwest Engineering Works, Chicago

Ohio Power Shovel Co., Lima, O.

Orton Crane & Shovel Co., Chicago

Speeder Mchy, Corp., Cedar Rapids, Iowa

Star Drilling Machine Co., Akron, Ohio

Universal Power Shovel Co., Highland Park,

Mich. SHOVELS, GASOLINE

SHOVELS, STEAM SHOVELS, STEAM

*Industrial Brownhoist Corp., Cleveland

*Manitowec Engs. Wks., Manitowec, Wis.

*Osgood Company, Marion, Oh'e

*Thew Shovel Co., Lorain, Oh'e

American Holat & Derrick Co., St. Paul

Bucyrus-Erio Co., Eric, Pa.

Keystone Driller Co., Beaver Falls, Pa.

Marion Steam Shovel Co., Marion, Ohio

Orton Crane & Shovel Co., Chicago

SHOVELS, SPADES AND SCOOPS HOVELS, SPADES AND SCOUPS
American Mg. Co., Chattanooga, Tenn.
Ames Shovel & Tool Co., Boston
Baldwin Tool Works, Parkersburg, W. Va.
Beall Bros. Co., Alton, Ill.
Conneaut Shovel Co., Conneant, Ohio
Indiana Shovel Co., New Castle, Ind.
Jackson Shovel Co., Montpelier, Ind.
Pittsburgh Shovel Co., Pittsburgh, Pa.
Wood Shovel & Tool Co., Piqua, Ohio
Wyoming Shovel Works, Wyoming, Pa.

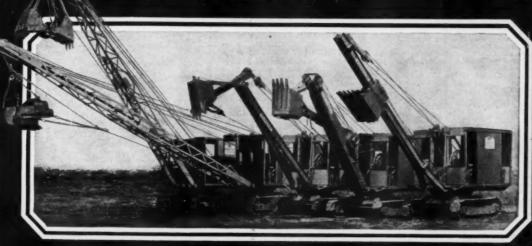
SIDEWALK AND ROAD FORMS (See Forms, Concrete)

SIGNS, STREET AND HIGHWAY Alumoyd Sign & Signal Co., Chicago Auto Sign Display Co. of Missouri, St. Louis, Auto Sign Display Co. of Missouri, St. Louis, Mo. Baltimore Enamel & Novelty Co., Baltimore Evernu-Century Sign Co., Boaton Horni Signal Mfg. Corp., New York Ingram-Richardson Mfg. Co., Beaver Falls, Pa. A. D. Joslin Mfg. Co., Manistee, Mich. Lyle-Signs, Minneapolis, Minn. Municipal Street Sign Co., New York Niles Machine Co., Lebanon, N. H. Persons-Majestic Mfg. Co., Worcester, Mass. Reddtex Signal Co., Cleveland, Ohio Rochester Street Signal Co., Rochester, N. Y. Standard Mfg. Co., Cedar Falls, Iowa Union Iron Products Co., E. Chicago, Ind. Western Stamping & Mfg. Co., St. Paul

SIRENS (See Pire Alarm Sirens)

SLEEVES, TAPPING AND VALVE Darling Valve & Mfg. Co., Williamsport, Pa. Mueller Company, Decatur, Ill. Rensselaer Valve Co., Troy, N. Y. A. P. Smith Mfg. Co., East Orange, N. J.

General's Staff



PRESENTED ATTHE-1930 ROAD SHOW

Alban Fractor Company, Baltimore, Md.
W. O. Allen, Toronto 2, Ontario, Canada
C. H. Arnold & Co., Pittsburgh, Pa.
Edward R. Bacon Co., San Francisco, Calif.
Bacon-Hibbard-Eichman, Inc., Cleveland, O.
Balzer Machinery Co., Portland, Ore.
Barzee Equipment Co., Syracuse, N. Y.
Bublitz Machinery Co., Kansas City, Mo.
Cyril J. Burke, Detroit, Mich.
Chadwick Machinery Co., Milwaukee, Wis.
Contractors Machinery Co., Toledo, O.
Contractors Sales Company, Inc., Albany, N. Y.
A. H. Cox, & Co., Inc., Seattle, Wash.
Arthur A. Davis, Indianapolis, Ind.
Edelen & Boyer Co., Philadelphia, Pa.
General Excavator Sales Co., Atlanta, Ga.,
General Excavator Sales Co., Minneapolis, Minn., Senteral Excavator Sales Co., Minneapolis, Minn., Senteral Excavator Sales Co., Spokane, Wash.
Gene E., Hoppe, Richmond, Va.

F. D. Lake Co., Grand Rapids, Mich.
Lakewood Equipment Co., St. Louis, Mo.
Lone Star Road Machinery Co., Dallas, Tex.
Neil B. McCinnis, Phoenix, Ariz, Mechanical Supplies Co., Cincinnati, O.
Milburn Machinery Co., Columbus, O.
C. O. Monat & Co., Ltd., Montreal, Can.
H. W. Moore Equipment Co., Denver, Colo.,
Morrissey Easton Tractor Co., Vicksburg, Miss.
Mr. F. J. Quinn, Chicago, Ill.
L. Li, Ross, Ruffalo, N. Y.
South Texas Implement & Machinery Co.,
Houston, Texas
Tennessee Tractor Co., Nashville, Tenn.
Vancouver Machinery Depot, Ltd., Vancouver,
B. C.
Waldo Hoos, Co., Inc., Boston, Mass.
Robt, G. Walls & Co., Memphis, Tenn.
West Virginia Machinery Co., Charleston,

and

THE GENERAL EXCAVATOR CO.
MARION, OHIO

WHERE TO PURCHASE ...

SLUICE GATES (See Gates, Sluice)

SMOKE STACKS (See Chimneys, Steel)

SNOW PENCING

*Good Roads Machinery Co., Kennett Sq., Pa. Illinois Wire & Mfg. Co., Joliet, Ill. Wickwire-Spencer Steel Co., New York

SNOW REMOVAL MACHINERY

*Alis-Chalmers Mg. Co., Springfield, Ill.
*Austin-Western Boad Machinery Co., Chicago
*Baker Mg. Co., Springfield, Ill.
*Caterpillar Tractor Co., Cleveland, Ohio
*Cleveland Tractor Co., Cleveland, Ohio
*Good Roads Machinery Co., Kennett Sq., Pa.
*N. P. Helson Iron Works, Passaic, E. J.
*W. A. Riddell Co., Bucyrus, Ohio
*Trackson Co., Miwaukse, Wis.
J. D. Adams Co., Indianapolis
Austin Mg. Co., Chicago
Batavia Steel Plate Consin. Co., Batavia, N. Y.
Byers Mach. Co., Ravenna, Ohio
Clark Tructractor Co., Battle Creek, Mich.
For Rotary Snew Broom Co., New York
Carl H. Frink, Chayton, Thousand Islands,
N. Y.

Goo. Haiss Mfg. Co., New York

N. Y.

Geo. Haiss Mfg. Co., New York
The Heil Company, Milwaukee, Wis.
Killefer Mfg. Co., Los Angeles, Calif.
Klauer Mfg. Co., Dubuque, Iowa
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa
Mack Trucks, Inc., New York
Maine Steel Products Co., So. Portland, Me.
Mead-Morrison Mfg. Co., E. Boaton
New England Road Machy. Co., So. Boston,
Mass. Mass.

Owensboro Ditcher & Grader Co., Owensboro.

Ky.
Rotary Snow Plow Co., Minneapolis
Ryan Mfg. Corp., Chicago
Walah's Holyoke St. Blr. Works, Holyoke.
Mass.
Watter Snow Fighters, L. I. Oity, N. Y.
Wausau Iron Wks., Wausau, Wis.

SPADES (See Shovels)

SPRAYERS, ASPHALT AND TAR *Littleford Bros., Cincinnati Kinney Mfg. Co., Boston

SPRAYING MACHINERY FOR TREES John Bean Mfg. Co., Lansing, Mich. Deming Co., Salem, Ohio Field Force Pump Co., Elmira, N. Y. Fitshenry-Guptill Co., E. Cambridge, Mass. Friend Mfg. Co., Gasport, N. Y. Hardie Mfg. Co., Hudson, Mich.

SPRAY PAINTING MACHINERY (See Painting STREET BROOMS

SPREADERS, SAND

*Good Boads Machy. Co., Kennett Square, Pa.

*Chas. Hvass & Co., New York
Goroco Mechanical Spreader Co., Philadelphia
Highway Service Co., New Bedford, Mass.
Tarrant Co., Saratoga Springs, N. Y.
Warren Bros. Co., Boston, Mass.

SPREADERS, STONE

*Austin-Western Road Machinery Co., Chicago

*The Burch Corp., Crestline, Ohio

*Chas. Hyass & Co., New York

Galion Iron Works & Mfg. Co., Galion, Ohio
Highway Service Co., New Bedford, Mass.
Shaw-Enochs Tractor Co., Minneapolis
Universal Road Machinery Co., Kingston, N.Y.

STACKS, STEEL

**Blaw-Knox Co., Pittsburgh, Pa.

**Connery & Co., Inc., Philadelphia
**Heltzel Steel Form & Tron Co., Warren, Ohio
**Birmingham Tank Co., Birmingham, Ala.
Canton Art Metal Co., Canton, Ohio
Chattanooga Boiler & Tank Co., Chattanooga,

Tenno Conc. Markellite Co., Birmingham, Ala.

STREET LIGHTING EQUIPMENT

American Conc. Markellite Co. Fore Chattanooga Boiler & Tank Co., Chattanooga,
Tenn.
Chicago Bridge & Iron Works, Chicago
Graver Corp., Chicago
Int'l. Comb. Eng. Corp., Chattanooga, Tenn.
Lancaster Iron Works, Lancaster, Pa.
New York Central Iron Works Co., Inc., Hagerstown, Md.
Petroleum Iron Works Co., Sharon, Pa.
Pittaburgh-Des Moines Steel Co., Pittsburgh,
Pa.
W. B. Scaife & Sons, Pittsburgh, Pa.
Tippett & Wood, Phillipsburg, Pa.

STANDPIPES AND ELEVATED TANKS

TANDPIPES AND ELEVATED TANKS
W. E. Caldwell Co., Louisville, Ky.
Chatta. Blr. & Tank Co., Chattanooga, Tenn.
Chicago Bridge & Iron. Works, Chicago
R. D. Cole Mig. Co., Newnan, Gs.
Int'l. Comb. Eng. Corp., Chattanooga, Tenn.
Lancaster Iron Works, Lancaster, Ps.
Pacific Tank & Pipe Co., San Francisco
Petroleum Iron Works Co., Sharon, Ps.
Pittaburgh-Des Moines Steel Co., Pittsburgh,

Pa. J. S. Schofield's Sons Co., Macon, Ga. Tippett & Wood, Phillipsburg, Pa. United Iron Works, Inc., Kansas City, Mo.

STEAM SHOVELS (See Shovels, Steam)

STEEL PLATE CONSTRUCTION

*Blaw-Knox Co., Pittaburgh, Pa.

*Connery & Co., Philadelphia

*Heltzel Steel Form & Iron Co., Warren, Ohio

*Joseph Honhorst Co., Cincinnati, Ohio

*Littleford Bres., Cincinnati, Ohio

*Union Iron Works, Hoboken, N. J.

Bethlehem Steel Co., Bethlehem, Pa.

Biggs Boiler Works, Akron, Ohio

Birmingham Tank Co., Birmingham, Ala.

Chatta. Boiler & Tank Co., Chattanoga, Tenn.

Chicago Bridge & Iron Works, Chicago

Graver Corp., East Chicago, Ind.

Int'l. Comb. Eng. Corp., Chattanoga, Tenn.

Heli Co., Milwaukee, Wis.

Hendrick Mfg. Co., Carbondale, Pa.

Lancaster Iron Works, Lancaster, Pa.

McClintic-Marshall Co., Pittsburgh, Pa.

New York Central Iron Works Co., Inc.,

Hagerstown, Md.

Pennsylvania Bridge Co., Beaver Falls, Iowa

Petroleum Iron Works Co., Sharon, Pa.

Pittsburgh-Des Moines Steel Co., Pittsburgh,

Pa. STEEL PLATE CONSTRUCTION

Pa.
Riter-Conley Co., Plttsburgh, Pa.
W. B. Scaife & Sons. Pittsburgh, Pa.

STEEL SHEET PILING *Wemlinger, Inc., New York

STREL TOWERS, CONCRETE *Insley Mfg. Co., Indianapolis, Ind. *Lakewood Engr. Co., Cleveland, O. *Ransome Conc. Machinery Co., Dunellen, N. J.

STOKERS, MECHANICAL

Babcock & Wilcox Co., New York
Dayton Stoker Co., Dayton, Ohio
Detroit Stoker Co., Detroit
Sanford Riley Stoker Co., Worcester, Mass.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Ps.

STREET AND ROAD SIGNS (See Signs)

*Chas. Hvass & Co., New York
Kendallville Brush & Broom Co., Kendallville,
Ind.
Joseph Lay Co., Portland, Ind.
Osborn Mfg. Co., Cleveland, Ohio

*Chas. Hvass & Co., New York Durlach Can & Iron Works, Brooklyn, N. Y. Rochester Can Co., Rochester, N. Y. Tarrant Mfg. Co., Saratoga Springs, N. Y.

*Austin-Western Road Machy. Co., Chicago .

*Charles Hvass & Co., New York

*White Co., Cleveland, Ohio

*E. D. Ehryre & Co., Oregon, Ill.

Austin Mfg. Co., Chicago

Autocar Co., Ardmore, Pa.

Federal Motor Truck Co., Chicago

Heil Co., Milwaukee, Wis.

Kinney Mfg. Co., Boston

Mack Trucks, Inc., New York

Municipal Supply Co., South Bend, Ind.

Whitehead & Kales Co., Detroit

THEET LIGHTING EQUIPMENT
American Conc. Marbelite Co., Forest Park, Ill.
J. B. Clow & Sons, Chicago
Electric Ry. Equipment Co., Cincinnati, Ohio
Graybar Electric Co., New York
Holophane Co., New York
Line Material Co., So. Miwaukee, Wis.
J. S. Schofield's Sons Co., Macon. Ga.
Union Metal Mfg. Co., Canton, Ohio
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

STREET SIGNS (See Signs, Street)

STREET SWEEPERS

*Austin-Western Road Machy. Co., Chicage .

*Chas. Hvass & Co., New York

Acme Road Machy. Co., Frankfort, N. Y.

Austin Mfg. Co., Chicago

Butler Mfg. Co., Cleveland, Ohio

Elgin Sales Corp., New York

Kinney Mfg. Co., Boston

Whitehead & Kales Co., Detroit

STREET SWEEPER BROOMS REFILLED *Chas. Hvass & Co., New York Kendallville Brush & Broom Co., Kendallville,

Ind.
Joseph Lay Co., Portland, Ind.
Osborn Mfg. Co., Cleveland, Ohie
Standard Brush & Broom Mfg. Co., Chicago

STUMP PULLERS

*Beebe Bros., Inc., Seattle, Wash.

*Sasgen Derrick Co., Chicago
H. L. Bennett & Co., Westerville, Ohio
Ersted Mg. Co., Portland, Ore.

John Waldron Corp., New Brunswick, N. J.

SUBGRADING MACHINES *Blaw-Knox Co., Pittsburgh, Pa.
*Kochring Co., Milwaukee
*Cakewood Eng. Co., Cleveland, Ohie
Ted Carr & Co., Chicago
The Hug Co., Highland, Ill.
Shaw-Enocha Tractor Co., Minneapolis

SURFACERS & GRINDERS, CONCRETE *Concrete Surfacing Machy, Co., Cincinnati .
Chicago Pneumatic Tool Co., New York
Cleveland Pneumatic Tool Co., Cleveland
The Dallett Co., Philadelphia
Ingersoll-Rand Co., New York
Tousley Tool Co., Cleveland

SURVEYORS' INSTRUMENTS (See Instru-

SWITCHBOARDS

*Allis-Chalmers Mfg. Co., Milwaukee General Electric Co., Schenectady, N. Y. Wagner Electric Mfg. Co., St. Louis, Mo. Westinghouse Electric & Mfg. Co., East Pitts-burgh, Pa.

TAMPERS, PNEUMATIC

*Independent Pneumatic Teol Co., Chicage Chicago Pneumatic Tool Co., New York Cleveland Pneumatic Tool Co., Cleveland, O. Cleveland Rock Drill Co., Cleveland Ingersoll-Rand Co., New York

TAMPING MACHINES, CONCRETE BLOCK Cement Block Machinery Co., Newark, N. J. Zagelmeyer Cast Stone Block Mchy. Co., Bay City, Mich.

**Connery & Co., Inc., Philadelphia
Biggs Boiler Works, Akron, Ohio
Birmingham Tank Co., Birmingham, Ala.
Chicago Pneumatic Tool Co., New York
Curtis Pneu. Mchy. Co., St. Louis, Mo.
Gardner-Denver Co., Quincy, Ill.
Graver Corp., East Chicago, Ind.
Heil Co., Milwaukee, Wis.
Indiana Pump & Compr. Co., Indianapolis
Ingersoll-Rand Co., New York
Lancaster Iron Works, Lancaster, Pa.
Nagle Engine & Boiler Works, Erie, Pa.
National Tube Co., Pittaburgh, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh,
Pa.

R. Senife & Scare Pittsburgh TANKS, AIR COMPRESSOR

Pa.

W. B. Scaife & Sons, Pittsburgh, Pa.

Westinghouse Tract. Brake Co., Wilmerding,
Pa. Worthington Pump & Mchy, Co., New York

TANKS, STEEL

ANKS, STEEL

*Columbian St. Tank Co., Kansas City, Mo.

*Connery & Co., Philadelphia

*Joseph Honborst Ce., Cincinnati, Ohio

*Chas. Hyass & Co., New York

*Littleford Bros., Cincinnati, Ohio

Biggs Boller Works. Akron, Ohio

Birmingham Tank Co., Birmingham, Ala.

8. F. Bower & Co., Inc., Ft. Wayne, Ind.

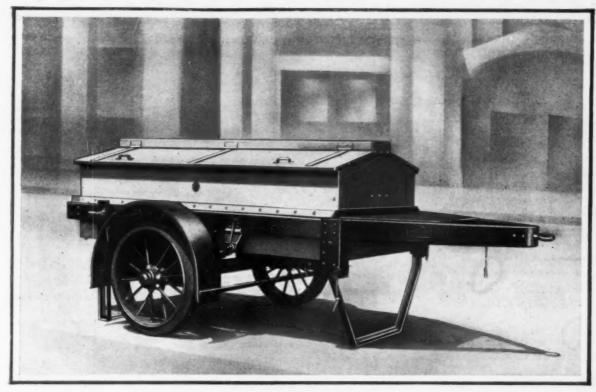
Burnham Boiler Corp., Irvington, N. Y.

Butler Mfg Co., Mineapolis, Minn.

J. I. Case Threshing Machine Co., Racine,

Wis. Wis.
W. E. Caldwell Co., Louisville, Ky.
Canton Art Metal Co., Canton, Ohio
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.
Chicago Bridge & Iron Works, Chicago
Dover Boiler Works, New York
Farrell Mfg. Co., Jollet, Ill.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



TIS is the Littleford All-Steel Heavy-Duty Tool Box. On display at the A. R. B. A. Road Show—Booth 507-521, in the Center of Exhibition Hall.

AT THE A.R.B.A. ROAD SHOW

under the LB sign. Littleford designed maintenance equipment.

spray and motor driven spray attachments that bring new efficiency in penetration and skin patch work; the latest heavy-duty maintenance kettle with new draft arrangement, We'll be glad to send it by return mail.

Looking for maintenance equipment? Booth semi-elluptical springs, Timken roller bearings 507-521, in the very center of Exhibition Hall— and high-speed chassis; Surface Heater; Traf-O-Mark and Winter heating units.

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LITTLEFORD BROS.

485 E. Pearl Street,

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ROAD & STREET IAINTENANCE EOUIPMENT

Please mention the Contractors and Engineers Monthly-it helps.

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C. C. Fonts Ce., Middletown, Ohio Graver Corp., E. Chicago, Ind. R. Hardesty Mfg. Co., Denver, Colo. Heil Co., Milwaukee, Wis. Int'l. Comb. Eng. Corp., Chattanoogs, Tenn. Hendrick Mfg. Co., Carbondale, Pa. Lancaster Iron Works, Lancaster, Pa. Nagle Eng. & Boiler Works, Erie, Pa. New York Central Iron Works Co., Hagers-

town, Md.
Pacific Tank & Pipe Co., San Francisco
Petroleum Iron Works Co., Sharon, Ps.
Pittsburgh-Des Moines Steel Co., Pittsburgh.

Ps. Riter-Conley Co., Pittsburgh, Ps. W. B. Scaife & Sons, Pittsburgh United Iron Works, Inc., Kansas City, Mo.

TANKS, WOOD

ANKS, WOOD

W. E. Caldwell Co., Louisville, Ky.
G. M. Davis & Son, Palatks, Fla.
Eagle Tank Co., Chicago
Hauser-Stander Tank Co., Cincinnati, Ohio
Kalamasoo Tank & Silo Co., Kalamasoo, Mici
National Tank & Pipe Co., Portland, Ore,
Pacific Tank & Pipe Co., San Francisco
Redwood Mfrs. Co., San Francisco
Redwood Mfrs. Co., San Francisco
A. T. Stearns Lumber Co., Boaton
U. S. Wind Eng. & Pump Co., Batavia, Ill,
Wendnagel & Co., Chicago

TAPES, STEEL AND METALLIC

Eugene Dietzgen Co., New York Keuffel & Esser Co., Hoboken, N. J. Lufkin Rule Co., Saginaw, Mich. The L. S. Starrett Co., Athol, Mass.

*Barrett Co., New York
American Tar Products Co., Pittsburgh, Pa.

TAR KETTLES (See Kettles)

TESTING LABORATORIES

*Patrig Testing Laboratories, Des Moines, Ia. Allentown Testing Laboratory, Allentown, Pa. E. L. Conwell & Co., Philadelphia Robt, W. Huns Co., Chicago New York Testing Lab., New York Pittsburgh Testing Lab., Pittsburgh

THAWING OUTFITS

*Chausse Oil Burner Co., Elkhart, Ind. *Littleford Bros., Cincinnati Aeroil Burner Co., West New York, N. J. Hauck Mfg. Co., Brooklyn, N. Y.

TIES, STEEL

Carnegie Steel Co., Pittsburgh, Pa. International Steel Tie Co., Cleveland, O. Koppel Ind. Car & Equipment Co., Koppel, Pa. Sweet's Steel Co., Williamsport, Pa.

TIRES, RUBBER (For Motor Trucks) Firestone Tire & Rubber Co., Akron, O. Fisk Tire Co., Chicopee Falls, Mass. B. F. Goodrich Rubber Co., Akron, Ohio Goodyear Tire & Rubber Co., Akron, O. Kelly Springfield Tire Co., New York U. S. Tire Co., New York

TOOL HOUSES, PORTABLE STEEL *Blaw-Knox Co., Pittsburgh, Pa. *Littleford Bros., Cincinnati, Ohio

TORCHES, OIL HEATING **TORCHES, OIL HEATING**

**Chausse Oil Burner Co., Elkhart, Ind.

**Connery & Os., Philadelphis, Pa.

**Littleford Bros., Cincinnati

Hauck Mg. Co., Brooklyn, N. Y.

Hoosier Paint Works, Ft. Wayne, Ind.

Mead-Morrison Mg. Co., East Boston, Mass.

Sewall Paint & Varnish Co., Kansae City, Mo.

Sherwin-Williams Co., Cleveland, O.,

Tropical Paint & Oil Co., Cleveland, O.,

Truscon Laboratories, Detroit, Mich.

TORCHES, WARNING

*Toledo Pressed Steel Co., Toledo, Ohie R. E. Dietz Co., New York McCloskey Torch Co., Toledo, Ohio

TOWERS (See Standpipes and Elevated Tanks)

TRACKS, INDUSTRIAL AND PORTABLE **ERACKS, INDUSTRIAL AND PORTABLE **
*Lakewood Eng. Co., Cleveland, O.
Atlas Car & Mfg. Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Foundry & Mfg. Co., Columbus, O.
Easton Car & Construction Co., Easton, Pa.
C. W. Hunt Co., Inc., W. N. Brighton, N. Y.
Koppel Ind. Car & Equipment Co., Koppell, Pa.
Sweet's Steel Co., Williamsport, Pa. Pa. Y. TRACTION TREADS (See Treads, Traction)

TRACTORS

*Altis-Chaimers Mfg. Co., Milwaukee
*Atlas Engineering Co., Clintonville, Wis.
*Caterpillar Tractor Co., Cleveland, C.
*Cleveland Tractor Co., Nav Holstein, Wis.
*W. A. Riddell Co., Bucyrus, Ohio
*Engers Bros. Corp., Albion, Pa.
*United Tractors & Equipment Corp., Chicago
Advance-Ramely Thresher Co., Laporte, Ind.
Autocar Co., Ardmoro, Pa.
Bates Mfg. Co., Joliet, Ill.
J. I. Case Threshing Machine Co., Racine, Wis.
Clark Tructractor Co., Batic Creek, Mich.
Electric Wheel Co., Quincy, Ill.
Emerson-Brantingham, Rockford, Ill.
Hart-Parr Co., Charles City, Ia.
Lombard Tractor & Track Corporation, N. Y.
Mead-Morrison Mfg. Co., E. Boston
Minneapolis-Moline Power Imp. Co.,
apolis
Shaw-Enochs Tractor Co., Minneapolis
Wohr Co., Milwaukee

*Allis-Chaimers Mfg. Co.
TRANSFORMEES
*Allis-Chaimers Mfg. Co.
American Brown Boven
Puncan Elec. Mfg. Co.

TRACTOR HITCHES

*Gustav Schaefer Co., Cleveland Trail-iT Co., St. Paul, Minn. Whitehead & Kales Co., Detroit

TRAFFIC LINE MARKING MACHINES

*Littleford Bros., Cincinnati, Ohio Continental Prod. Co., Euclid, O. Newaygo Engr. Co., Newaygo, Mich.

TRAFFIC PAINT

J. E. Bauer Co., Los Angeles, Cal.
Continental Prod. Co., Euclid, O.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Hoosier Paint Wks., Ft. Wayne, Ind.
Hanline Bros., Baltimore, Md.
Tropical Paint & Oil Co., Cleveland, O.

TRAFFIC PLATES

Alan Wood Iron & Steel Co., Philadelphia American Pressed Steel Co., Philadelphia Central Iron & Steel Co., Harrisburg, Pa.

TRAFFIC SIGNALS

**Tolede Pressed Steel Co., Toledo, Ohio Acme Traffic Signal Co., Chicago Alumoyd Sign & Signal Co., Chicago Alumoyd Sign & Signal Co., Chicago Alumoyd Sign & Signal Co., Chicago Amer. Gas Accumulator Co., Elizabeth, N. J. Auto Sign Display Co. of Mo., St. Louis, Mn. Cretney Traffic Guide Co., Madison, Wis. Crouse-Hinds Co., Syracuso, N. Y. Eagle Signal Sales Corp., Moline, III. Essco Mg. Co., Peoria, III. Griswold Safety Signal Co., Minneapolis Horni Signal Mg. Corporation, Newark, N. J. Line Material Co., South Milwankee, Wis. Little Giant Co., Mankato, Minn. Rochester Street Signal Co., Rochester, N. Y. Tokheim Oil Tank & Pump Co., Fit Wayne, Ind.

**Tokheim Oil Tank & Pump Co., Fit Wayne, Ind.

**Temental Mason Safety Tread Co., Lowe Mass.

American Mason Safety Tread Co., Lowe Mass.

American Mason Safety Tread Co., Lowe Mass.

**Oncrete Steel Co., N. Y. Norton Co., Worcester, Mass.

TREADS, TRACTION

Buckeye Traction Ditcher Co., Findlay, O. **Oaterpillar Tracter Co., San Leandro, Cal. **Tractor Co., Minaukee

Belle City Mg. Co., Racine, Wis. Electric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co. San Leandro, Cal. **Tractor Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co. San Leandro, Cal. **Tractor Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co., San Leandro, Cal. **Tractor Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co., San Leandro, Cal. **Tractor Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co., San Leandro, Cal. **Tractor Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Detroit Tractor Co., San Leandro, Co., Minaukee**

Belle City Mg. Co., Racine, Wis. Co., Racine, Wis. Cleetric Wheel Co., Toledo, O. Whitehead & Kales Co., Ind.
Traffic Equipment Corp., N. Y.
Union Iron Prod. Co., E. Chicago, Ind.
Welsbach Traffic Signal Co., Philadelphia

TRAFFIC WARNING SIGNS (See Signs)

TRAILERS AND SEMI-TRAILERS

**PRAILERS AND SEMI-TRAILERS

**Davenport Loco. & Mig. Corp., Davenport, Ia.

**Electric Wheel Co., Quincy, Iii.

**Euclid Crane & Hoist Co., Euclid, Ohio

**Highway Trailer Co., Edgorton, Wis.

**Chas. Hwass & Co., New York

**Rogers Bros. Corporation, Albion, Pa.

**Gustav Schaefer Co., Cleveland

Arcadia Trailer Corporation, Newark, N. J.

Detroit Trailer & Mach. Co., Detroit

Eagle Wagon Works, Auburn, N. Y.

Easton Car & Construction Co., Easton, Pa.

Fruehauf Trailer Co., Detroit, Mich.

Imperial Mach. Co., Minneapolis

LaPlant-Choate Mig. Co., Cedar Rapids, Iowa

Miami Trailer-Scraper Co., Troy, O.

Muskogee Iron Wks., Muskogee, Okla.

Smith Trailer Corp., Syracuse, N. Y.

Trailmobile Co., Cincinnati

Troy Trailer & Wagon Co., Troy, O.

Warner Mig. Co., Beloit, Wis.

Whitehead & Kales Co., Detroit

TRAILERS. HEAVY MACHINERY *Highway Trailer Co., Edgerton, Wis.
*Chas. Hvass & Co., New York
*Rogers Bros., Corporation, Albion, Pa. TRAILERS, INDUSTRIAL

TRAILERS, INDUSTRIAL

*Electric Wheel Co., Quincy, Ill.

*Highway Trailer Co., Edgerton, Wis.

*Chas, Hvass & Co., New York

*Lakewood Eng. Co., Cleveland, O.

*Bogers Bros. Corporation, Albion, Pa.

*Gustav Schaefer Co., Cleveland, O.

Clark Tructractor Co., Batle Creek, Mich.

Detroit Trailer & Machinery Co., Detroit

Easton Car & Construction Co., Easton, Pa.

LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa

Miami Trailer-Scraper Co., Troy, O.

Trailmobile Co., Cincinnati

Whitehead & Kales Co., Detroit

*Gustav Schaefer Co., Cleveland. Trail-iT Co., St. Paul, Minn.

TRAMWAYS, AERIAL WIRE ROPE (See Aerial Wire Rope Tramways)

*Allis-Chalmers Mfg. Co., Milwaukse
American Brown Boveri Corp., Camden, N. J.
Duncan Elec. Mfg. Co., Lafayette, Ind.
Enterprise Elec. Co., Warren, O.
General Elec. Co, Schenectady, N. Y.
Kuhlman Elec. Co., Bay City, Mich.
Maloney Electric Co., St. Louis
Pittsburgh Trans. Co., Pittsburgh, Pa.
Wagner Elec. Corp., St. Louis
Westinghouse Elec. & Mfg. Co., E. Pittsburgh,
Pa.

TRANSITS AND LEVELS (See Instruments)

TRANSMISSION MACHINERY, POWER

*Allis-Chalmers Mfg., Co., Milwaukee Chain Belt Co., Milwaukee Dodge Mfg. Corps., Mishawaka, Ind. Kent Machine Co., Kent, O. Link-Belt Co., Chicago Webster Mfg. Co., Chicago Weller Mfg. Co., Chicago

TRASH CANS (See Cans)

TREADS, SAFETY

*Blaw-Knox Company, Pittsburgh, Pa. American Abrasive Metals Co., N. Y. American Mason Safety Tread Co., Lowell,

*Buckeys Traction Ditcher Co., Pindlay, O.
*Caterpillar Tracter Co., San Leandro, Cal.
*Trackson Co., Milwaukee
Belle City Mg. Co., Racine, Wis.
Electric Wheel Co., Quincy, Ill.
Rex-Watson Corp., Canastota, N. Y.
Tractor Grip Wheel Co., Toledo, O.
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TRENCH PUMPS (See Pumps, Centracters')

TRUCKS, TANK & SPRINKLER (See Wagons, Tank & Sprinkler)

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De Laval Steam Turbine Co., Trenton, N. J.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., N. Y.
J. P. Morris & De La Vergne, Inc., Phila.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

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Canton Fdry & Mach. Co., Canton, O.
Champion Engine Co., Kenton, O.
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Mean More Work Plus Reduced Costs

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Ample air flow to the carburetor and finally for gas atomization is just as important as cleaneed air. Either condition enhances the efficiency of the power plant, if not from sluggish performance, through greater fuel consumption. To overcome these conditions in the H series, a double air cleaner is used as standard equipmen It provides ample area which

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Yours cordially,

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THE CLEVELAND TRACTOR CO.

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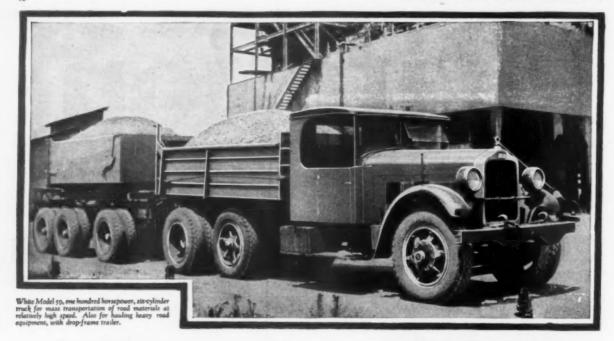


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The Cleveland Tractor Company
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There's a WHITE for every type of road work FOURS AND SIXES

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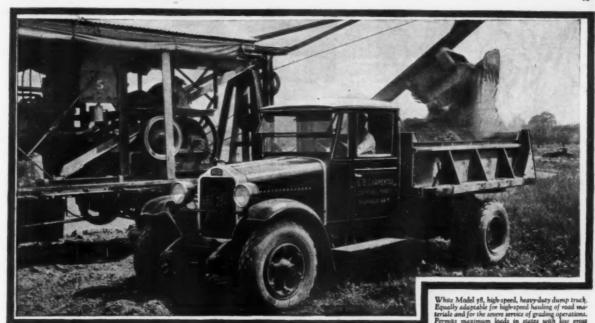
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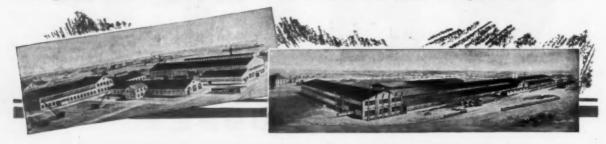
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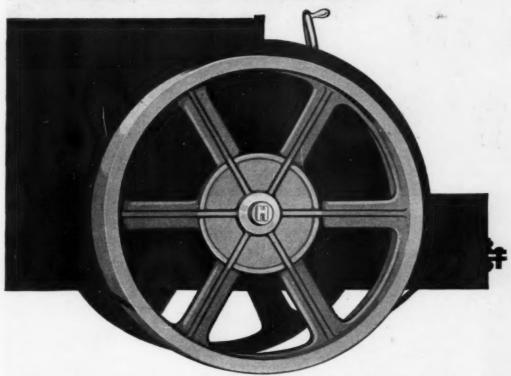
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Powerful, rugged and massive, it handles as easily as the finest motor car. Built of steel throughout—with the exception of the engine cylinders—it will give long uninterrupted service and many years of economical usefulness. Flexible and mobile, it has three speeds forward and three speeds backward—low speed $1\frac{1}{2}$ miles per hour—intermediate 3.2 miles per hour—high speed $5\frac{1}{2}$ miles per hour. This means fast work on all rolling jobs whether on sub-grade or surface. And it also means quick transportation between jobs.

Powered with a six-cylinder motor with ample reserve means smooth reversing and quick movement on grades. The high travel speed and surplus power makes it an ideal tractor. All gears and clutches run in a bath of oil housed in a cast steel dust-proof transmission-



ULES Road Roller



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Weight uniformly distributed and wheel pressures in accordance with the requirements of the several State highway specifications. Well balanced and machined to close micrometric tolerances.

Manufactured by one of the oldest producers of road-building machinery—fifty years successful experience in this field—five large plants well equipped and well manned and served by four trunk line railroads. The Hercules is the greatest single advance in road-building equipment since the advent of the revolving power shovel.

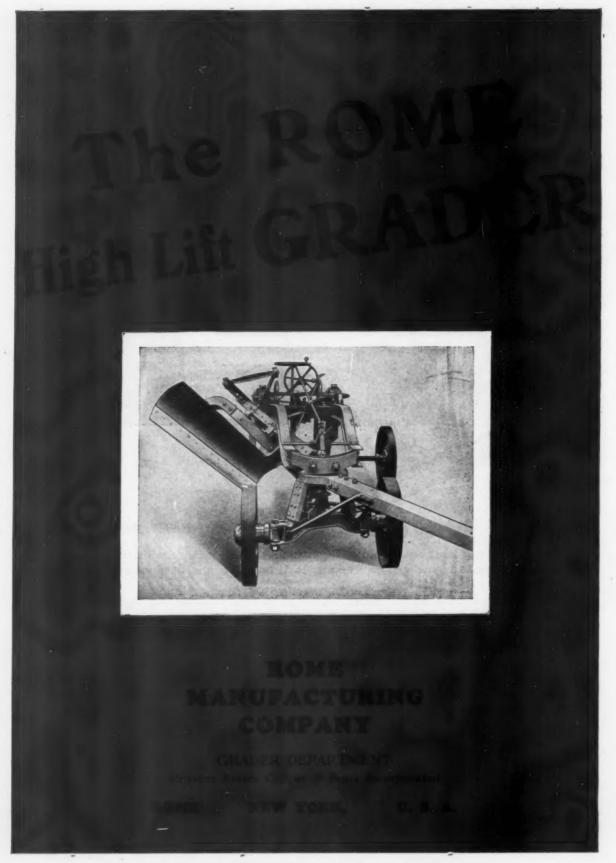
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THE HERCULES COMPANY, MARION, OHIO

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BUTLER BIN COMPANY Waukesha, Wis.



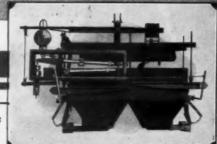
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Look at it. Weighs less than a hundred pounds complete with fuel tank, magneto and built-in 1½ H.P. Homelite gasoline engine. Stows in tool box or front seat of auto (21"x

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Needs no foundation, sets anywhere on its vibration-absorbing spring feet and is shaped right for an easy onehand lift by the handle on top.

Runs 4 to 5 hours on a gallon of gas, needs no attention, lasts many years.

Built not merely to look good, but to make good—and is doing it. Distributors all over the world for demonstration and service. Write for address of the nearest or see it at the Road Show.

See exhibit at Atlantic City Road Show, January 11th to 17th, inclusive.

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71 Riverdale Ave., Port Chester, N. Y.

Homelite Portable Centrifugal Pump

For volume.
7,500 gal. per hour, 20 ft. lift
50 ft. Head.
complete with built-in 1½.
hp. Homelitengine, Bosci

hp. Homelite hgine, Bosc waterproc an Homelite Ba Type Foo Valve.

Homelite Self-Priming Electric Centrifugal Pump

Capacity up to 7,500 gal. per hour. Weight with 1½ hp G. E. Motor 135 lbs. 110-220 v., 60 cy cle, single phase or 110-220-550 v., 3 phase.

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Blows up to 3,000 cu. ft. air per minute. Complete with built-in 1½ hp. Homelite air cooled gasoline engine, Bosch waterproof magneto and

engine, Bosch waterpro on magneto an 15-ft. air duct weighs 75 lbs Homelite Portable Electric Plant

110 v. or 32 v., 600 watts
D.C. with built-in Hemelit
1½ hp. air cooled gasolinengine, Boscl
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Available in

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Standard machine has capacity 24"; however, machines of increased capacity as 36", 42" and 48" can be supplied to order.

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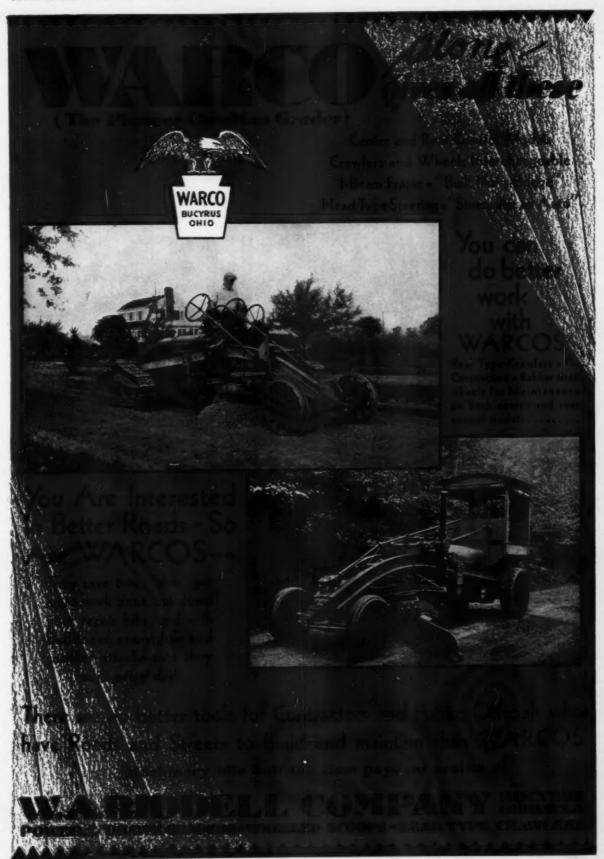
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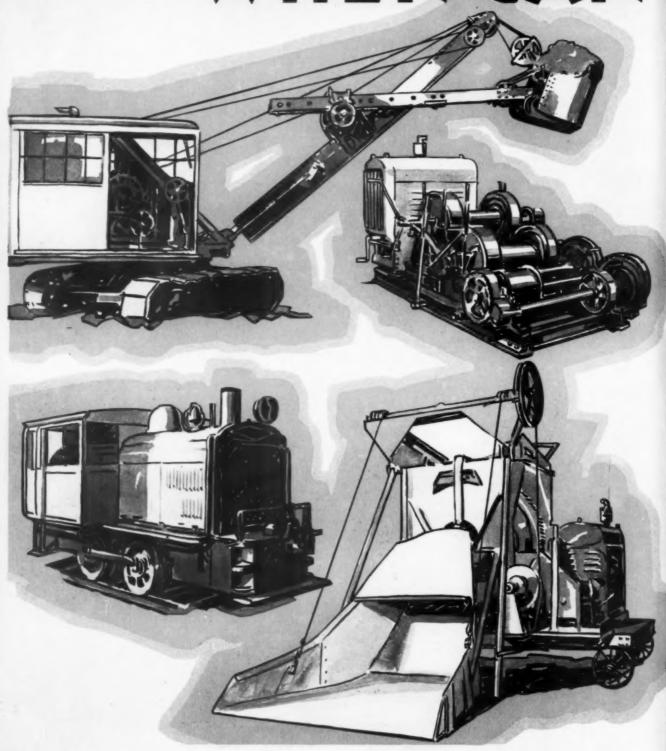




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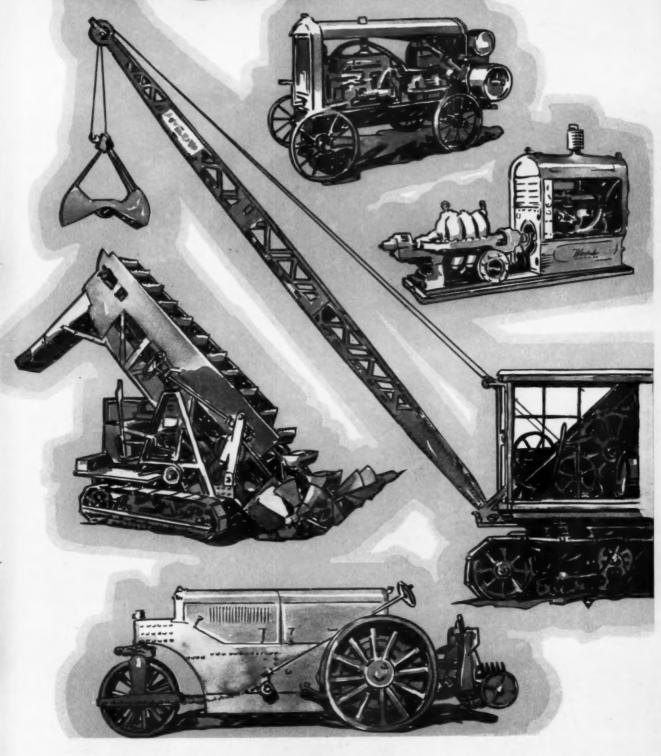


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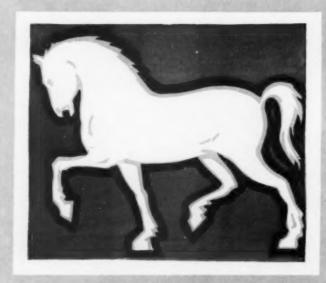


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3

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9

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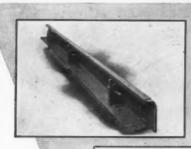
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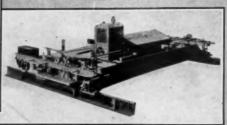
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CONTRACTORS AND ENGINEERS MONTHLY

57

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BATCHERS—WEIGHING, VOLUME

STEEL FORMS FOR STREETS and SIDEWALKS

BALL WAGON GRADER

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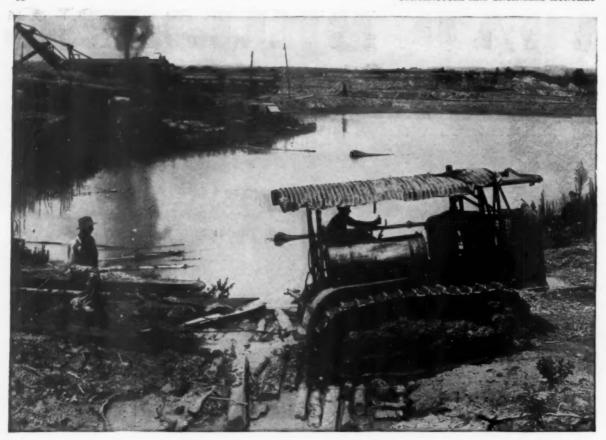
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Two compartment bins are made in 60, 73, 74 and 91 tons capacity and are shipped in two and three sections. Three compartment Bins similar to this plant in 68 and 82 tons are also standard. See the 73 ton Bin at the ROAD SHOW.

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for the Road Builder



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Designed expressly for water supply purposes, these pumps will deliver an ample quantity of water for paver, concrete curing and all other needs of the Road Builder.

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"Domestic" Automatic Priming Centrifugal Pump

A dewatering pump of large capacity that will prime itself and automatically maintain its prime whenever there is enough water to seal and fill the suction line.

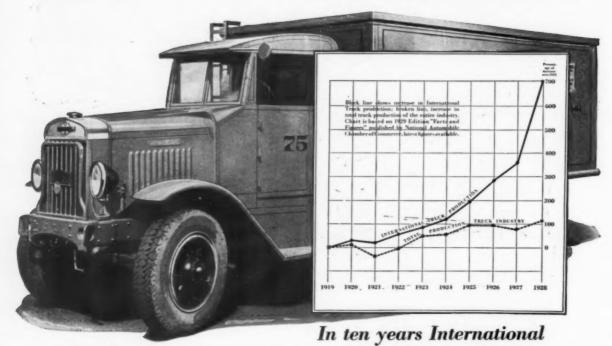
On bridge abutment work the Road Builder will find this type of pump a great saver of time and money.

Built in several sizes. Capacities from 300 to 1200 gallons per minute

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We can promise you some new and interesting ideas to help cut your 1930 costs.

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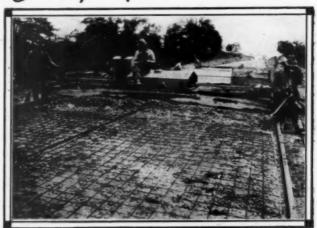
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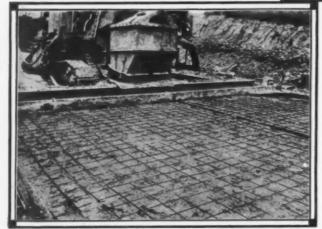
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For reliable clutch information and service write.



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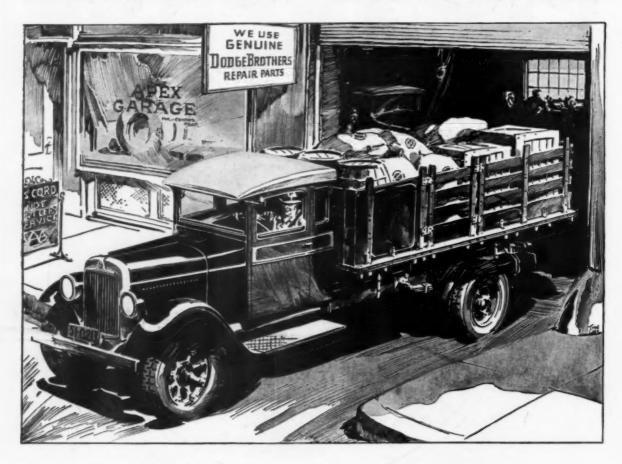
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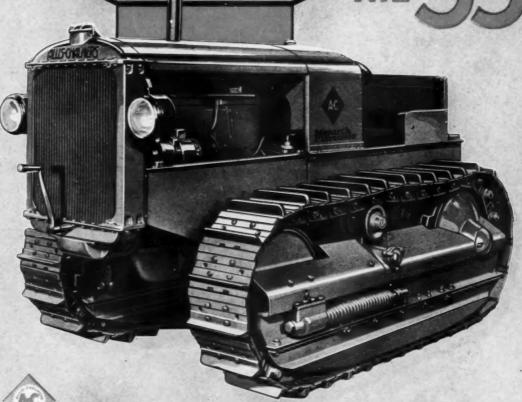
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Now comes the Monarch "35"... to parallel the achievements of the "75" and the "50" in every detail but size. It is new only in its announcement at this time. Already it has a history of enviable accomplishment... equivalent to years of strenuous service. It represents the engineering skill of an organization more than eighty years old in knowing how... Confidently and sincerely, Allis-Chalmers offers the "35"... and in keeping with the company's policy, complete satisfaction is guaranteed.... To build the greatest tractors that man's ingenuity can devise and machines produce... and to sell them at the lowest cost per drawbar horsepower... this is the seemingly impossible which Allis-Chalmers has made a fact in the "35", the "50", and the "75".

ALLIS-CHALMERS MANUFACTURING CO.

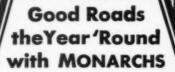
Specialists in Power Machinery Since 1846
Monarch Tractors Division
SPRINGFIELD, ILL.

THE 35



Allis - Chalmers
Monarch Tractors

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When Monarch power is pushing the snow plow, the deepest, hardest packed drifts are conquered. The picture shows a Monarch "75" and Baker Snow Plow in deep drifts near Sturgeon Bay, Wis. There's plenty of snow...and it's packed hard... but the Monarch is clearing the way.

Monarchs meet emergencies and overcome them with irresistible power. Last winter, in Webster County, Iowa, an ice jam buried the road to a depth of 6 to 8 feet. A Monarch "75" was put on the job...and the road was plowed clear in short order.

Attachment of Monarchs to snow plows of all types is a simple matter. A direct connection to the power take-off of the Monarch drives the rotary snow plows. Wind-tight cab and electric starter and lights may be had when desired. Write for a copy of "Bucking the Blizzards with Monarchs."

ALLIS-CHALMERS MFG. CO.

Monarch Tractors Division SPRINGFIELD, ILL. 475"—450"—435"



Construction Abstracts

How the Other Fellow Has Done It

I-Beams Raised by Box Stackers

1. During the construction of the structural work of a new factory addition, the contractor recently used portable elevators or stackers such as are used in warehouses to pile boxes, for raising the I-beams to position. Two hand power machines of different heights were used and the operation was entirely successful. Two men did the work and each beam was in place in a moment, none of the usual crane equipment being necessary. The average weight of the I-beams was 2,100 pounds and they measured 31 feet 8 inches in length. Each of the stackers used was of 750 pounds capacity so that the overload of 600 pounds, while not amounting to a great deal when divided between the two machines, still had to be considered.

Finishing Concrete on An Extra Wide Curve

The Ohio contractor who built a section of concrete road near Cleveland handled the finishing of the 24-foot section of the road in a novel manner.

On this section a 21-E Foote paver was used with a specially built 24-foot Lakewood finishing machine. Because of the exceptionally steep grades a very dry mix was used to prevent the concrete from slumping. The result was a remarkably smooth surface. The finishing machine ran on the granite curb with the strike-off 6 inches below the top of the curb. This machine was arranged so as to tamp and screed the concrete below the top of the curb. To provide a smooth track to run on, specially designed angles were fitted on the curb. A smooth

nnish on this section was secured by using a 3-inch iron pipe 14 feet long as a roller. Ropes were attached to either end of the pipe to eyebolts which were placed so that the pipe would roll when pulled back and forth. It required four men to operate it. The weight of the pipe was sufficient to pull forward the excess water and laitance at the same time filling the voids in any dry concrete. It also disclosed any rough places in the surface which were corrected by repeated rolling.

16.1.12

Arc Welding a Cross Country Pressure

3. In laying a 45-mile high pressure pipe line a Houston, Tex., contractor put in a bid of \$1.25 per joint for electric arc welding as against \$2.75 per joint for oxy-acetylene welding. The country over which this line ran was very rugged and broken. There were hills, deep ravines, woodlands and a river to be crossed. Five gas-engine-driven stable arc welders were used. In the field work the welders operated as a team. That is, four men simultaneously welded four consecutive joints and then moved on. The lengths thus formed were joined together by a bell hole operator.

The line was built in 5-mile stages, each stage being finished and tested under hydrostatic or gas pressure before further pipe was laid. The joints were all made in two layers. A total of only 14 pinholes were found in 11,000 joints. 16.5.345

Compact Plant Layout for Telephone Building

4. In the construction of a New Jersey telephone building by a New York contractor great care was taken to get a compact plant layout and to select the right type of equipment. Excavating started December 16. Various arrangements of the plant were considered. The usual wood tower and hoist was laid out, its cost estimated and the cost of operation figured. The cost of a steel tower, with its chute for placing concrete without rehandling, was estimated, and, also, the cost of a steel mast plant, chuting to floor hoppers and then wheeling the concrete into place.

The steel mast plant installation was decided upon. Storage bins for sand and crushed stone were designed and built so that the bulk materials could be delivered by truck and

dumped directly into the bin, the bin feeding by gravity into the hopper of the mixer. A total of 2,870 cubic yards of concrete was involved in this work, which warranted the expenditure of the necessary money on stone and sand bins, as against the alternative method of handling the aggregate by wheeling from stock piles on the ground.

To guard against freezing weather conditions during the construction of the building, a horizontal tubular boiler was installed close to the material bin. Steam jets were laid under the aggregate bins so that

live steam could be fed into them. Steam from these jets would filter up through the crushed stone and sand, keeping the aggregate warm and free from ice. Enough steam was generated from the boiler to run the engine which drove the concrete mixer and furthermore, live steam was available for use with nozzles on the floors for cleaning ice and snow from the forms and steel.

16.2.82

Don't Pass These Up

Not content with giving readers of Contractors and Engineers Monthly practical articles on construction, items on new equipment as soon as it is announced, as well as a complete list of manufacturers of construction equipment and materials, we are now publishing Construction Abstracts. These pointed paragraphs pick out single operations or methods that are novel and which have proved successful. They are presented for your use. Don't pass them up.

Salvaged Equipment Cuts Labor Cost

5. A Connecticut contractor who has handled several jobs on Cape Cod, Mass, made ingenious use of old equipment in a sand pit for handling aggregate for his Cummer hot mix plant. A Nelson bucket loader operated at the end of the line, digging into the bank and was supplied with ample quantities of sand from the bank by one man who started small slides of sand from the face of the bank toward the loader with a scoop. An old Koehring aggregate loader about 50 feet long was used to convey the sand horizontally to a storage pile near the mixer plant. A none-too-new bucket loader carried the sand from the bottom of this storage pile to the drying bins of the plant. Careful maintenance of the equipment made breakdowns infrequent.

The Results Speak for Themselves



These tests were made on pavement placed in late autumn and protected by a straw covering against cool weather.

> Tests Made on the Job By Robert W. Hunt Co., Chicago Compressive Strength* lb. per sq. inch Cylinder 3-day 7-day 28-day Number 2193 2229 1892 2441 2122 4033 3467 3891 10 11 4068 12 3378 13 5271 4952 Average 2121 3767 5110

*Concrete as commonly mixed and placed for paying reaches a strength of about 2000 lb. in from 14 to 21 lays, whereas this concrete averages more than that in 3 days.

Location: A block of city pavement in a heavily traveled industrial and freight warehouse district, E. North Water Street, Chicago.

Time of Opening: Pavement was opened in sections, some in 4 days and some in 5 days.

Contractor: James A. Sackley Co., Chicago

No comments are needed; the results speak for themselves.

high-early-strength concrete with the same Universal cement used for regular work will be sent on request. Use the coupon to send for your copy of this paving booklet.

> Universal Portland Cement Co. 208 South La Salle Street, Chicago

Without obligation, please send booklet containing methods for obtaining high-early-strength concrete with the same Universal cement used for ordinary paving work.

Universal Portland Cement Co.

Subsidiary of United States Steel Corporation

Chicago Pittsburgh Minneapolis Duluth Cleveland Columbus New York.

Concrete for Permanence

A Well-Organized Brick **Paving Project** in Ohio

By Colonel Robert S. Beightler,

Chief Engineer, Bureau of Construction, Ohio Department of Highways



A Part of the Crew of 300 Employees on This



RICK road construction is not an uncommon sight in Ohio, but since some states are not endowed with this very fine product for pavement wearing surfaces, it has been suggested that an article on a typical brick paving project might prove interesting. The job selected is an active contract

near Cleveland, known as Sections A, B & C of State Highway No. 33, or U. S. Route No. 422, the Cleveland-Burton Road.

The three sections sold in this contract totaled 4,091 miles in length, the pavement being 36 feet and 40 feet in width, and included 91,500 square yards of brick surfacing. This contract was awarded in July, 1929, and was completed January 1, 1930. The contractor was the Highway Construction Co., Cleveland, Ohio, one of the largest road contracting firms in this part of the country, Col. R. S. Beightler doing a yearly business of from \$4,000,000 to

\$5,000,000. The total contract price on this project was \$497,999.45.



EQUIPMENT

A partial list of the larger equipment consists of the following:

- 5 Thew Lorain-75 shovels
- 2 27-E Foote mixers
- 2 Lakewood finishers with special screeds
- 2 One-man Russell power graders
- 3 Kelly-Springfield rollers
- 2 Best 60 tractors
- 2 Russell Super-Mogul graders

- 2 Browning locomotive cranes—11/2-yard buckets (Also used on other work at same time)
- 1 Blaw-Knox batcher
- 1 Littleford Bros. asphalt tank trailer

DESIGN

For the most part a concrete base 9 inches in thickness, mix of 1:7, and reinforced with mesh weighing 56 pounds to 100 square feet, was specified. Where the old pavement was salvaged the base thickness was reduced to 6 inches.

A subbase course of granulated slag 4 inches in thickness was first placed over the prepared subgrade.

The total bid price per square yard for the 9-inch concrete base, including reinforcement and slag subbase course, was \$2.60.

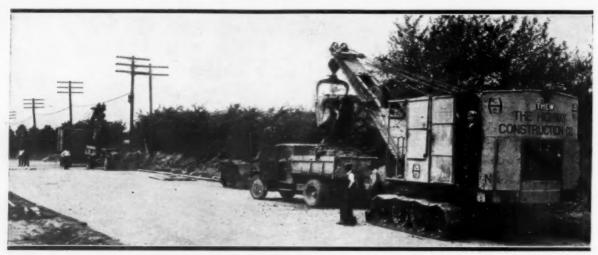
The wearing course consisted of 3 x 4 x 81/2inch plain wire-cut paving brick which were laid in a 34 inch granulated slag cushion. Asphalt filler was used. The total contract price per square yard for brick pavement, complete in place, including brick, filler

cushion, was \$1.58.

The curbing specified, except that used at intersections, was 6 x 20-inch Berea or Amherst stone, and was laid with a gravel base and backing. The Cleveland Quarries Co., Cleveland, Ohio, furnished this curbing. All circular or radius curbing was granite and was shipped in from Georgia.

GRADING

Since this contract included approximately 45,000 cubic yards of excavation it was important that the contractor employ considerable grading equipment for the first few weeks in order to get started promptly with the base paving. To accomplish this he placed five



A Part of the Grading Equipment Used

Thew Lorain-75 shovels of 11/4-cubic yard capacity on the job, and it was only a few days before the concreting was started. By September 26 all but two of the shovels had been released to other work.

CONCRETE BASE

It has only been a comparatively short time since the concrete base, not being subjected to direct traffic, and also escaping to some extent the rapid variations and extremes in temperatures at certain periods, was a somewhat neglected feature in brick road construction. It was not considered important that the base surface be so smooth or that the concrete be cured in any manner. The cushion of sand or slag was supposed to correct any base irregularities. Experience has shown us that the cushion "cure-all" is simply a palliative as the brick top soon conforms to the base surface.

Today we have the same requirements for placing, finishing and curing concrete base that we have for concrete pavement. The result is that properly constructed brick pavements are as smooth as any type of pavement construction.

The same requirement for curing the base that exists for concrete pavement is maintained with the exception that earth is not permitted on the base, it being difficult to entirely remove before laying the cushion. This results in the contractor using either the "puddling" or wet straw method, the latter being generally employed.

The base is also carefully checked for smoothness by means of the "surface-tester" or "bumpometer" and all variations in the surfacing exceeding 1/4-inch in 10 feet are corrected.

PLACING

The concrete was placed in two strips, each one-half the total width. It will be noted from the accompanying photographs that it was possible to keep both the trucks hauling materials and the mixers off the subgrade.

Two 27-E Foote mixers were used and excellent progress was made. The base was started on August 5 and completed October 15, a total of 55 working days for the placing of 91,500 square yards of concrete base. For a part of the construction the mixers were placed



Setting the Stone Curb Before the Second Strip of the Concrete Foundation Course Was Poured

together, the one placing the concrete up to the mesh reinforcing while the other mixer placed the balance. Later on the mixers were used separately on different

parts of the project.

Lakewood finishing machines, specially made to permit one runner to ride the raised curbing, were used with very satisfactory results. To secure an even riding surface for the finisher, steel angles, 4 x 3 x 5/16 inches, were placed on top of the stone curbing. These were anchored in the ground at regular intervals.

BATCHING

The materials were batched at the large plant owned by the contractor not far from the job. Two Browning locomotive cranes, 1½ cubic yards capacity, were used for unloading from the cars and into the batcher plant and storage yard. A Blaw-Knox 80-ton batcher plant

For the most part the brick was "hacked" carefully alongside the curbing, thereby preventing the chipping and breaking which often results when dumping directly from trucks, and also permitting greater ease of handling when delivering to the "droppers." Most contractors consider the extra cost of "hacking" as justified because of the extra yardage laid, less culling and the saving of brick.

CUSHION

The brick was laid on a ¾-inch granulated slag cushion. Experience has proved this thickness to be adequate with the smoother base construction secured under present specifications, and it is also believed that there is less of a tendency for a movement of the cushion under continuous pounding of traffic with the resultant irregularity of brick surface. Slag



CONCRETING THE FOUNDATION COURSE

1. The batcher plant, showing the two Browning locomotive cranes. 2. Placing concrete with one of the Foote 27-E pavers. Note that the paver operated from the completed strip. 3. One of the Lakewood finishing machines with a special screed. 4. Curing the base with wet hay, showing also the "bumpometer" or surface tester used on the base

was used for this contract and also various county and city contracts under construction by the company at the same time. From 30 to 40 cars of material were unloaded daily, and at times they had as high as 200 cars of aggregates in storage piles.

BRICK

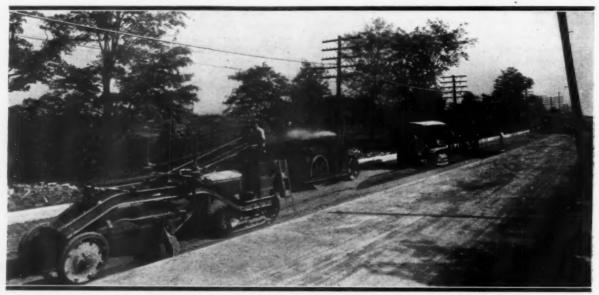
The brick wearing course was started as soon as it was possible for traffic to use a portion of the concrete base. To determine this, concrete beams were made and submitted to the flexural tests, the requirements being that the beams must develop a modulus of rupture of not less than 500 pounds per square inch. The brick was furnished by the Metropolitan Paving Brick Co., Canton, Ohio, this concern being probably the largest manufacturer of paving brick in the Middle West.

makes an excellent cushion and is preferred generally to sand because it hardens up sufficiently to prevent lateral movement. It is also quite noticeable that granulated slag will "set up" enough to bridge over the cracks which develop in the concrete base, whereas sand will usually filter through with the ultimate settlement of the brick surface.

For controlling the crown and to insure proper placement of the cushion, square wooden forms were used to permit the riding of the template. After spreading, the bed was rolled with a light tandem roller, and again after the final coating, with a light hand roller.

LAYING

The brick was delivered to the bricklayers or "droppers" by gravity carriers from either side of the street. Five bricklayers were used, one man doing most of the



Base Laid on One Side, Paving on Other Half. Note Mixer Operating from the Base Already Laid

"batting in." Excellent progress was made, the laying of brick actually starting on September 16 and being completed on November 5, 1929, with the brick laying crew averaging about 2,500 square yards per day.

FILLING

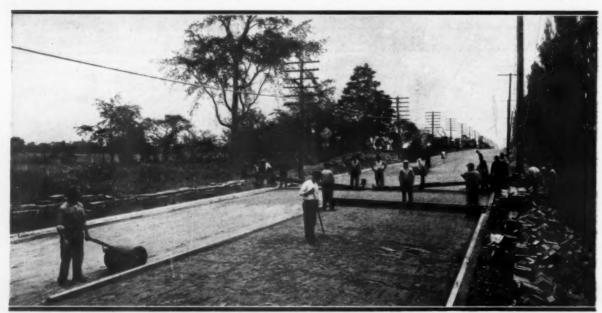
An asphalt filler having a penetration of from 50 to 60, and ductility of from 10 to 30 cm., was used with satisfactory results.

The contractor employed a rather unusual and extremely economical method of handling and placing this material for a part of the project. Instead of the usual method of having the asphalt delivered in solid form in drums and then melting in kettles, the contractor had the liquid asphalt delivered in 10,000 gallon tank cars

from which he transferred it by gravity to large storage tanks of 20,000 gallons capacity. Asphalt delivered in this form is not only cheaper but also is considerably more economical in applying. The asphalt was heated to the proper temperature in the storage tanks by boilers, and then hauled to the job as needed in tank trailers holding 1,150 gallons, a piece of equipment manufactured by Littleford Bros., Cincinnati, Ohio. In these tanks the asphalt was maintained at a temperature of approximately 375 degrees Fahrenheit.

The asphalt was applied to the brick surface by pressure through a hose with a nozzle which controlled the rate of flow, and it was flushed into the joints by hot iron squeegees.

This method was satisfactory as long as the tempera-



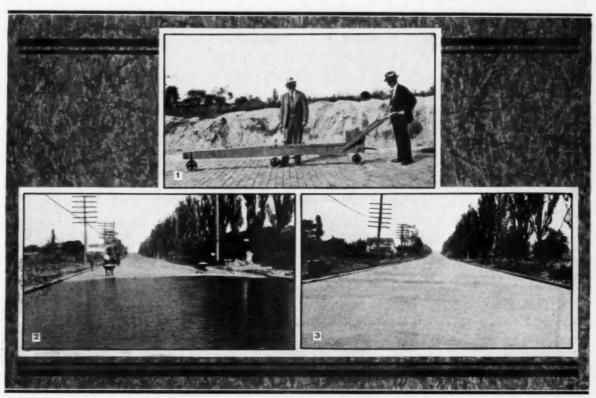
Laying Brick. Note Wooden Forms Used Along the Curbing and in the Center of the Road for the Cushion Template to Ride

ture of the brick pavement was above 65 degrees but during the latter part of this construction it was found advisable to revert to the usual method of using wheeled pouring kettles equipped with squeegees. The kettles used on this project were also manufactured by Little-tord Bros. They insure full penetration of the asphalt into the interstices and also leave less coating on the surface of the brick than any other method devised thus far in Ohio.

The resultant pavement is very satisfactory. It is

Organizing Commission for International Road Congress Appointed

THE American Organizing Commission in charge of the Sixth International Road Congress has recently been appointed by Secretary of State Stimson. The Congress is to be held in Washington, October 6 to 13, 1930, by invitation of the United States Government. This Organizing, Commission acts for the Permanent International Association of Road Congresses, with headquarters in Paris, and functions under the authority of the State Department. Thomas H.



THE BRICK COURSE LAID, FILLED AND COMPLETE

The finished brick course before the asphalt filler was applied. E. C. Blosser, Chief Engineer, the Highway Construction Co., is giving the bumpometer a push over the brick while Daniel Davis, Engineer-Inspector for the state, looks on.
 The bituminous filler just after placing and ready for the sand covering.
 The completed pavement with the sand covering not yet worn off.

smooth riding, presents a beautiful appearance and is of adequate design and properly constructed so as to guarantee many years of good service.

PERSONNEL

Representing the contractor, E. C. Blosser, Chief Engineer of the company, served in a supervisory capacity. Mr. Blosser was formerly Chief Engineer of the Ohio State Highway Department. Melvin Greenig was the contractor's superintendent actively in charge of the work.

Representing the State of Ohio and Cuyahoga County which participated in the cost of the project were: Daniel Davis, Engineer-Inspector; W. W. Anderson, Division Engineer; Fred R. Williams, Resident Engineer; James McCleary, Road Engineer, Cuyahoga County; and George Kerr, Assistant Engineer.

MacDonald has been named Secretary-General of the Commission,

Roy D. Chapin, Chairman of the Highways Committee of the National Automobile Chamber of Commerce, has been appointed President of the Commission and the other members are Thomas H. MacDonald, Chief of the United States Bureau of Public Roads and Chairman of the Highway Education Board; Wilbur J. Carr, Assistant Secretary of State; Thomas R. Taylor, Department of Commerce; Robert P. Hooper, American Automobile Association; Henry G. Shirley, American Association of State Highway Officials; Charles M. Uphan, American Road Builders Association; A. J. Brosseau, Chamber of Commerce of the United States and H. H. Rice, Highway Education Board.

Headquarters for the Commission have been established in Washington where preliminary arrangements for the Congress will be made by the staff. The Congress is expected to bring to the United States from 2,000 to 3,000 delegates, leading highway authorities of their respective countries, representing virtually every nation in the world.

Rebuilding the Mohawk Trail

Extensive Penetration Job Running Through Three Towns
Completed In One Construction Season
by D'Onfro Bros., Inc.



ASSACHUSETTS took a leaf from the specifications of the Middle West states this year and closed a main traffic artery completely so that the contractor might proceed with the rebuilding of the road without the hindrance of a constant stream of tourist cars mingling with the stone and

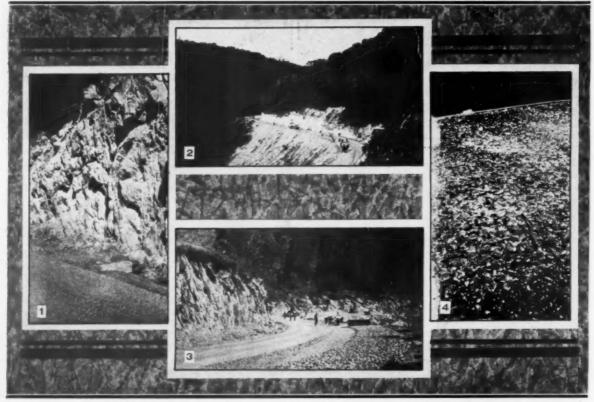
asphalt trucks. The Mohawk Trail extending from North Adams on the west through the towns of Florida, Savoy and Charlemont was closed and three contracts let for resurfacing and rebuilding the old surface with a standard Massachusetts bituminous macadam penetration pavement. If the Trail had not been closed it is estimated that it would have taken about three years to accomplish the same work with the annoyances of traffic.

In spite of political pressure and the pleadings of Chambers of Commerce the highway was closed to the public until the work on the roadway was completed on September 25 when the Governor of the Commonwealth drove through with a special escort and then the highway was thrown open to the public with a big civic celebration on September 28 just six months from the time D'Onfro Bros., started the work of resurfacing in the town of Florida.

CHARACTER OF THE WORK

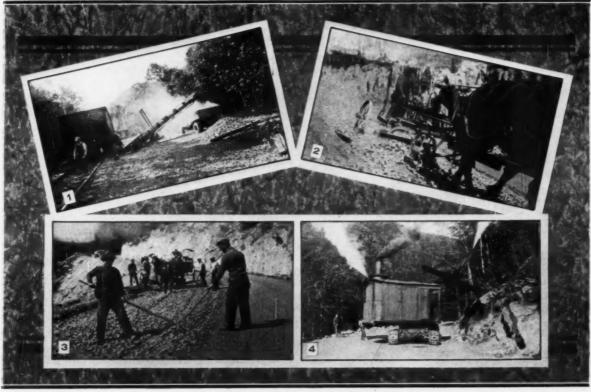
The Mohawk Trail was built in 1912-14 at a cost of \$220,000 and took two years to complete. The roadway was narrow and of earth with oil blanket. It was not intended for heavy motor traffic but the beauty of the route attracted a host of tourists each year. Repairs on the highway increased in amount and cost each year and caused no end of inconvenience to the traffic. The present reconstruction work covering about 16 miles will cost in the neighborhood of \$1,000,000.

The first contract to be completed was that of the Lane Construction Co., which extended from the North Adams city line and into the town of Florida for about



THE NEW WIDENED MOHAWK TRAIL WAS HEWN OUT OF SOLID ROCK

1. A typical ledge section, showing drill marks in the hard rock after blasting. 2. A long S-curve with a dozen men and three pieces of equipment rushing the rock into place a week before the Trail was opened. 3. The same curve as above but looking in the opposite direction showing a nicely banked widened curve. 4. Typical surface texture of the penetration macadam before the surface was filled with pea stone



STONE HANDLING ON THE D'ONFRO JOB

Unloading the No. 2 stone from gondola cars to trucks with a Barber-Greene conveyor.
 A horse-drawn patrol grader was one of the few pieces of equipment not motorized on the job. It was used to spread the stone after dumping by the trucks.
 Two-man hand rakes were useful in the final spreading of the coarse aggregate before rolling.
 One of the Erie steam shovels trimming the shoulders. This operation was continued after the road was opened to traffic.

4½ miles. This work included the reconstruction of the famous Hairpin Curve which was always the cause of much shifting of gears by motorists but now can be negotiated in high without difficulty.

The second contract was for the resurfacing of about 3 miles of highway with bituminous macadam, penetration method, in the town of Florida. The contract was awarded to D'Onfro Bros., Leominster, Mass., who also received the contract for the remaining section of the work through Savoy and Charlemont with the exception of a short section 2,600 feet long which was omitted in Charlemont pending arrangements with the Boston & Maine Railroad for the construction of a bridge over the railroad tracks eliminating a grade crossing, cutting several hundred feet from the present route and doing away with a sharp curve. The contract was awarded at \$451,700.

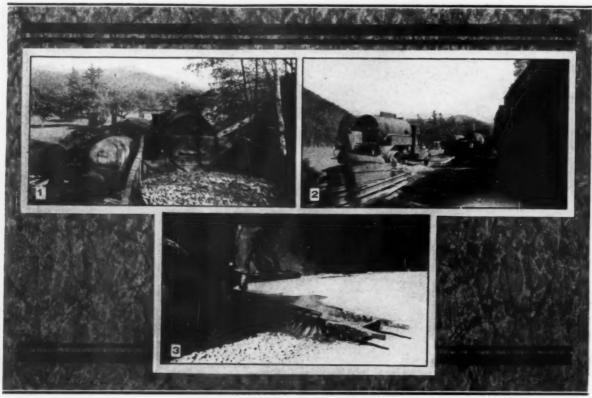
The present article deals with the work from Drury's Four Corners in the town of Florida to the end of the project in Charlemont. The work consisted of widening the old right of way which was altogether too narrow for safe motor traffic and the placing of the 24-foot penetration macadam pavement. At the curves the roadway was widened various amounts, the maximum being to 30 feet. A large amount of blasting was necessary to widen the roadway in ledge and to provide the necessary rock for base course, fill, and the rubble masonry for toe paving along streams and for embankment walls.

The maximum grade on the project which was a Federal Aid job was 7.48 per cent.

QUANTITIES

Grading equipment consisted of 5 power shovels, 3 Erie steam, 1 Bucyrus-Erie gas, and a Speeder gas shovel. An average of 1,000 pounds of 40 per cent Du Pont dynamite was used per day in blasting out the ledge along the right of way in widening the roadway. For drilling equipment the contractor used 5 Ingersoll-Rand portable compressors mounted on Ford trucks, and a Sullivan steam compressor plant which would operate. 8 jackhammers. The contractor found the larger plant more economical for the type of work encountered on this job. An Ingersoll-Rand drill sharpener was used to keep the drill steel in condition and this added greatly to the efficiency of the drilling operations as compared with sharpening by hand.

Holes for blasting were drilled from 6 to 15 feet and shot about 100 per day. In order to keep the drilling ahead of the shovels the crew was operated in shifts 24 hours a day for a part of the season. Carbic flares were used for lighting the work at night. The road was frequently completely blocked by the blasts, and con-



ASPHALT HEATING AND APPLICATION

The Socony asphalt heating plant, showing the White insulated booster tank between the tank car and the truck.
 A distant view of the heating plant with one of the Etnyre distributors in the foreground.
 The start of penetration of a strip by an Etnyre distributor. This also shows the tray which was used to catch the first throw of the asphalt and thus prevent too great an application of the bituminous material.

siderable time was lost as the large pieces of rock had to be drilled and blasted again so that the shovels could handle them.

PROGRESS OF CONSTRUCTION

Progress of construction was slightly behind the schedule from the start when excavation began the middle of April until August 21 when the plotted curves for required progress and actual progress coincided. The contract was awarded to D'Onfro Bros. on January 22, 1929, after bids had been taken on December 27, 1928. Following the start of excavation in April, the first borrow excavation was started the first of May, spreading stone the first week of June, asphalt penetration the middle of June with a maximum of 15,000 gallons used in one day.

April was the Jonah month of the season with 22 rainy days which completely shut down the operations for that time. There were 4 days of rain in May, 3 half days in June, 3 half days and one whole day in July, none in August, and 3 days of rain in September.

DRAINAGE STRUCTURES AND RUBBLE MASONRY

The concrete structures for culverts, 1 bridge and 1 reinforced concrete box culvert were built by subcontract. Some of the cross pipes were built with drop inlets, others with head walls on one or both ends and varied from 12 to 60 inches in diameter. Concrete pipe was used for the cross drains for 12, 15, 18-inch and over and cast iron pipe for some of the smaller drains with

none over 24 inches in diameter. The subcontractor on the drainage structures used a portable Leach-Oshkosh mixer for pouring the headwalls.

The rubble walls for both toe walls along the streams and for embankment were built by subcontract. The dry walls along the streams amounted to 3,100 yards and the embankment walls to 700 yards.

UNLOADING AND PLACING CRUSHED STONE

The stone requirements for the job were a 2½-inch top of No. 1 stone from station 130 to station 280 in Florida over a waterbound macadam built in 1928 with an oil blanket. In Florida from station 280 to station 383 a 4½-inch stone surface was laid over stone fill. In Savoy and Charlemont a 6-inch surface was laid over a gravel foundation. No. 2 stone applied according to Massachusetts specifications is stone retained on a ¾-inch screen and passing a 1¼-inch screen. No. 1 stone is from 1¼-inch to 2½-inch sizes. The top of the new road is No. 1 stone to give a true non-skid surface and has no seal coat on grades over 30 per cent.

The stone was supplied by the Lane quarries in Westfield, Mass., and the Massachusetts Broken Stone Co., quarries at East Deerfield. Both quarries shipped the stone in gondola cars which were spotted on a spur of the Boston & Maine at Charlemont with the asphalt cars. The spur had a capacity of 20 cars of stone and 2 of asphalt. Stone was unloaded by two machines from pits dug beneath the tracks. A Barber-Greene

conveyor loaded the trucks direct from the track pit and a bucket elevator working from another pit loaded stone into a wooden bin from which the trucks were filled. As many as 15 cars were unloaded in a single day when the work was at its peak. The unloading crews consisted of one man in each car being unloaded and one man on each machine.

All hauling of stone was subcontracted and a fleet of 12 to 40 Schacht trucks from Providence, R. I., were furnished. Stone was spread on the road by a Galion stone spreader, by tripping the tail gate of the trucks and letting the stone run out as the body was tipped and the truck run forward and by dumping in one place. After the stone was spread roughly on the road it was spread to a smooth grade by hand raking with two-man rakes, by hand forking, and by two-horse patrol graders. At one time 6 rollers were on the job but throughout the entire job there were 5 rollers at work. There were 3 Acme gas rollers, 1 Huber gas roller, and 1 gas and 1 steam Buffalo-Springfield rollers. The contractor has placed his stamp of approval on the gas rollers as able to do as much work as two or three of the steam rollers. Another interesting fact was that it was difficult to get a man to run the steam rollers as the men all expressed a preference for the gas machines. A total of 43,000 tons of crushed stone was used on the job.

ASPHALT HANDLING

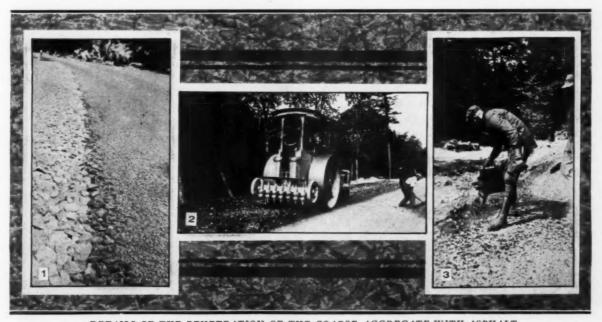
Socony asphalt furnished by the Standard Oil Co. of New York was used in two grades, Binder B and Binder C. The first has a penetration of 100 to 120 and the second a penetration of 85 to 100. The 1928 and 1929 specifications require the use of Binder B after the first of September and before the first of June because of its greater penetration. Binder C is used for all work before that date. The asphalt was received in tank cars which were spotted on the spur at the

extreme end where a vertical steam boiler was installed for heating the cars. Instead of trying to heat quickly the whole car of asphalt a booster was used. The car was heated to 250 to 300 degrees and then the asphalt pumped over into the booster tank by as asphalt pump operated by a Troy Engine & Machine Co. vertical steam pump. The pump and booster tank were mounted on an old truck chassis for easy transportation. In the booster tank the asphalt was heated to 350 degrees so that when it was run to the insulated distributor trucks it would hold sufficient heat to fulfill the specifications for application. Two Socony and one Etnyre distributor trucks were used. A total of 348,000 gallons of asphalt was used on the job.

One detail of operation that was worthy of note was the use of portable trays with sand spread in the bottom to catch the first flush of asphalt through the distributor heads as the truck started ahead. This prevented the asphalt being in excess at the points where the trucks started and stopped. Another was that when the tank trucks were stopped on the side and asphalt was being drawn from the tap at the back into a hand pouring pot for touching up the edges and such places as did not seem to have received sufficient asphalt, a shovelful of sand was cast on the road to catch the asphalt that dripped from the tap. This also prevented an excess of asphalt at that point. These two details have not been noted in many other states and are well worth copying by contractors even if the state specifications or resident engineer do not require them. They result in a more uniform job and less scratching of heads a year later when spots begin to bleed from excess asphalt.

The asphalt was applied at the rate of 2½ gallons per square yard. The first application was followed by ½-gallon seal coat except where seal was omitted and the first application was 2½ gallons. Immediately following

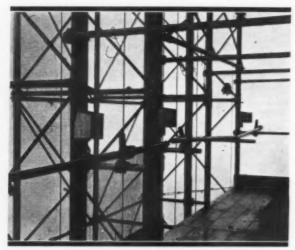
(Continued on page 114)



DETAILS OF THE PENETRATION OF THE COARSE AGGREGATE WITH ASPHALT

1. Appearance of the coarse aggregate before (left) and after penetration and rolling. 2. Rolling a newly penetrated strip and one of the hand casting crew at the right getting a shovelful of pea stone. 3. One of the Socony men touching up spots along the edge with a hand pouring pot.

Safety Measures



An Outside Tubular Hoist Tower from a Rumway. Note Bar Across Opening, Guard at the Side with Toe Board and Screening and the Little Wooden Boxes Housing the Electrical Signalling Outlet

Safety Measures

Put Into Actual Practice
by Fred T. Ley & Co.
on Chrysler Building,
New York

Accident Prevention of the Building Trades Employers Assn., New York, the safety methods employed by Fred T. Ley & Co., Inc., Springfield, Mass., in the construction of the Chrysler Building, New York City, are reported. This is one of a series of such bulletins which is being prepared by the Committee in order to promote safety in construction. The Chrysler Building, the tallest building in the world, has drawn considerable attention during its erection, not only because of its height but because of the many and unusual precautions taken to prevent accidents either to the workmen or to passersby.

ORDER AND CAREFULNESS RULE

Watchmen were located at each entrance to the building to keep out all unauthorized persons. All passageways were kept clean and all material neatly piled. The sidewalks around the building were continually swept clean by two watchmen retained for this purpose. The public was protected by a sidewalk shed of tubular steel construction, a neat appearing structure which did not in any way interfere with traffic. The inner side of the walk was completely closed in with a solid fencing and the supporting posts on the outer side were placed sufficiently far back from the curb to prevent displacement by trucks.

Injured men received first aid and subsequent examinations and treatments at a dressing station located on the ground floor. A graduate nurse was in daily attendance and a doctor made examinations there once a week.

Safety bulletins were on display near where the men checked in and out. These bulletins were changed frequently. The bulletin board was an inexpensive and practical one, without glass but well-illuminated.

Safe Stairways and Hoists
The steel erector used a durable ladder with three



A Safely Put Up Ladder. Note the Cleat at the Bottom and That the Ladder Extends at Least 3 Feet Above the Floor It Serves

Practically Applied

Contractor

Capitalizes Experience
on World's Tallest Building
and Proves Economy
of Safety First



This Board Is Displaying Too Many Posters. One Effective One Is All That the Average Workman Will Take Time to Read

stringers properly secured at top and bottom. The only temporary stairway was located on the main floor. The treads on permanent stairs were filled in with wooden planks considerably higher than the metal nosing. All stairways were kept clean and reasonably free

A Well Protected Hoisting Engine and Guarded Cable Located Near a Passageway Leading to a Passenger Elevator

from debris. All large openings in floors were enclosed with railings and toe-boards and in some instances a mid-rail, and small openings were planked over.

Bricklayers used suspended scaffolds roofed with solid planking covered by a tarpaulin and equipped with guardrail and toeboards with the space between filled in with wire netting. Catch scaffolds or aprons were placed about three floors below the scaffolds to catch falling material. Suspended scaffolds were used by the bricklayers to build up the shaft walls. They were equipped with overhead protection of solid planking and solid planking was placed several floors below to catch material which would drop. In one shaft there were three of these scaffolds being used at one time.

The outside hoist towers were of tubular steel, enclosed on three sides with wire netting of No. 16 U.S. standard gage with 1/2-inch mesh and with a bar across the opening. The hoists were of durable construction with a cover of wire netting of No. 10 U. S. standard gage with a 3/4-inch mesh. Sections of the cover were arranged to swing upward when handling bulky material. The enclosures around all of the inside hoist shaftways were of wood slat construction about 8 feet high with the slats placed vertically instead of horizontally. This method of construction prevents men using the slats as ladders. A pivotal bar was used across the entrance to the shaftway and was placed about 2 feet from the edge of the opening as required by the New York State Industrial Code Rules. When necessary, on account of ceiling structures, the bars were also pivoted about 4 feet from the end.

Each hoist was equipped with an electric signal system besides the regular pull cord, the latter to be used only as a stop signal in case of emergency. The electric system consisted of a bell located at the hoisting



A Strong Well Built Stairway with Mid-Rails and Smooth Hand Rails

engine, with insulated wires leading to all floors. At each floor, mounted on the barricade around the shaftway was an outlet box. Competent bellmen carried a short cord equipped with a plug, with prongs of curved construction at one end and a push button on the other. These bellmen were held responsible for this cord and carried it with them at all times, plugging in and giving signals when needed. By this method signals may be given at any floor but only by the possessor of a cord. The system becomes absolutely safe from unauthorized signals and insures signals being given by competent men. The expense of equipping hoists with this system is a minimum for an electric one, as there is little mechanism to get out of order.

The control of the hoists remained with the general contractor at all times. When a sub-contractor wished material moved he made his request known to the person in charge of hoists. The hoist with the engineer and two of the general contractor's signal men moved the material at a predetermined charge per hour for the sub-contractor, but the operation remained in the control of the general contractor at all times and the men were on his payroll.



A Typical Barricade Used Around the Hoist Shaftways

AUTOMATIC PHONE AND CALL SYSTEM

The job was equipped with an automatic call and telephone system with the switchboard and auto call device located in the contractor's job office. The personnel of all contractors was supplied with code numbers and whenever there was a need for any person, the telephone operator manipulated the call box and the proper code sounded automatically on all floors throughout the building. The person merely stepped to the nearest phone and received the message.

GUARDED SHAFTWAYS

Unused elevator shaftways had a hinged bar in preference to the gate ordinarily used. It is interesting to note that this entire door jamb, with pivotal bar, was made up as a unit in a shop. It has a lining of paper and it stays in place until the permanent elevator doors are installed. It serves as a protection to the jamb and does not interfere with the work necessary to be done close to the jamb either on the outside or inside of the shaft.

Elevators used for carrying workmen were completely enclosed and the openings were fitted with doors hinged to swing outward and locked on the shaftway side.

This application of safe methods, the result of accumulated experience on the part of the contractors, who are capitalizing on the proved economies of safety by putting safety ideas into practical use, is an excellent example of what can be done for safety on construction jobs.

State Highway and Bridge Disbursements

HIS data, collected by the American Road Builders
Association directly from the several states during
November, 1929, shows the total estimated state highway and bridge disbursements for 1929 and 1930, exclusive of
maintenance:

State	1929	1930
Alabama		
Arizona		
Arkansas		
California.		
Colorado		
Connecticut		
Delaware		
Florida		
Georgia		
Idaho.		
Illinois		
Indiana		
Iowa		
Kansas	8,600,000	
Kentucky	9,800,000	
Louisiana	14,800,000	
Maine	9,200,000	
Maryland	10,200,000	9,500,000
Massachusetts	13,100,000	10,000,000
Michigan	16,500,000	24,000,000
Minnesota	9,800,000	11,000,000
Mississippi	None	None
Missouri	25,000,000	25,000,000
Montana	6,890,000	4,500,000
Nebraska	5,000,000	6,000,000
Nevada	1,500,000	1,600,000
New Hampshire	3,600,000	5,800,000
New Jersey	32,900,000	35,500,000
New Mexico	2,500,000	3,300,000
New York	40,000,000	62,000,000
North Carolina	6.000,000	6,000,000
North Dakota	3,900,000	3,000,000
Olaio	18,400,000	23,500,000
Oklahoma	14,200,000	12,000,000
Oregon	4,700,000	4,000,000
Pennsylvania	44,000,000	44,000,000
Rhode Island	1,700,000	4,000,000
South Carolina	10,900,000	20,000,000
South Dakota	3,100,000	3,500,000
Tennessee	22,100,000	12,000,000
Texas	18,000,000	30,000,000
Utah.	2,200,000	2,200,000
Vermont	5,500,000	3,000,000
	11,000,000	12,500,000
	10,700,000	10,700,000
Washington	11,600,000	10,800,000
West Virginia	16,300,000	15 500 000
Wisconsin	2.100,000	15,500,000
Wyoming	2,100,000	2,700,000
	2201 700 000	8 600 000 000

\$591,520,000 \$629,000,000

WHO'S WHO AMONG MANUFACTURERS IN THE CONSTRUCTION FIELD

A. R. B. A. ROAD SHOW ATLANTIC CITY JANUARY 13-18 1930



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B. L. Boye, Standard Oil Co. of N. Y., New York, N. Y.



Charles T. Hvass, President, Charles Hvass & Co., Inc., New York, N. Y.



L. T. McGuire, Asst. Sales Mgr., The Byers Machine Co., Ravenna, Ohio

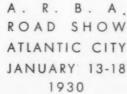


H. C. Beckwith, President and General Manager, The Byers Machine Co., Ravenna, Ohio



Carl S. Wagner, Sales Man-ager, Insley Manufacturing Co., Indianapolis, Ind.

WHO'S WHO AMONG **MANUFACTURERS** IN THE CONSTRUCTION FIELD





L. J. Kanitz, Manager, Industrial Division, Continental Motors Corp., Muskegon, Mich.



H. B. Burlow, Vice President, Templeton, Kenly & Co., Chi-cago, Ill.





Geo. P. Kittel, Aeroll Burner Co., Inc., West New York, N. J.



W. A. Biddell, Pres., W. A. Biddell Co., Bucyrus, Ohio





Carl F. Ebert, Adv. Mgr., W. A. Riddell Co., Bucyrus, Ohio



N. E. Jersey, Mgr., Boad Ma-chinery Sales, W. A. Biddell Co., Bucyrus, Ohio



B. R. Norris, Manager of Sales, Equipment Division, W - K - M Co., Inc., Houston, Texas



L. O. Koen, Vice-Pres., W-K-M Co., Inc., Houston, Texas



F. L. Stone, Gen. Sales Mgr., Universal Portland Cement Co., Chicago, III.



R. C. Holcomb, Service Mgr., National Carbide Sales Corp., New York, N. Y.



J. Vale Downie, Sales Manager, Keystone Driller Co., Beaver Falls, Pa.

Presiden! Hoover's conferences have strengthened general confidence. His suggestions for an early construction offensive have reacted favorably. Road and highway plans for 1930 call for expenditures exceeding 1929.

Frederic A. Reimer, President, American Road Builders Association.



J. E. Core, Sales Manager, Jackson Manufacturing Co., Harrisburg, Pa.



G. K. Specht, Vice President, Hercules Products, Inc., Evansville, Ind.



M. J. Sasgen, President, Sasgen Derrick Co., Chicago, Ill.



H. C. Merritt, Manager, Monarch Tractors Division, Allis-Chalmers Mfg. Co., Springfield, HL



Robert W. Gotshall, Sales Manager, Monarch Tractors Div., Allis-Chalmers Mfg. Co., Springfield, Ill.



Photo by Stein

R. Birdsell, Vice Pres. & Sales
Mgr., Perfex Corporation, Milwatked, Wisc.



A. J. Filliez, Sec. & Gen. Mgr., Fundom Hoist & Shovel Co., Lima, Ohio



Walter A. Olen, Pres. & Gen. Mgr., Four-Wheel Drive Auto Co., Clintonville, Wisc.



R. R. Howard, Vice Pres. in Charge of Sales, Anthony Co., Streator, Id.



P. A. Smythe, Pres., Thew Shovel & Universal Crane Companies, Lorain, Ohio



Prank A. Peck, Vice Pres., Thew Shovel & Universal Crane Companies, Lorain, Ohio



C. B. Smythe, Vice Pres., Thew Shovel & Universal Crane Companies, Lorain, Ohio



E. H. Wilson, Asst. Gen. Mgr. in Charge of Sales, Thew Shovel & Universal Crane Companies, Lorain, Ohio



H. A. Hutchins, Mid-Western Sales Mgr., Universal Crane Co., Lorain, Ohio



B. M. Mitchell, Pres., The Conveying Weigher Co., New York, N. Y.



Ramon S. Cram, Gen. Sales Mgr., Marion Steel Body Co., Marion, Ohio



Lee Madden, Vice Pres. in Charge of Sales, Stover Mfg. & Engine Co., Presport, Ill.



M. A. Fraher, John Deere Tracter Co., Waterloo, Iowa

The conferences at Washington under the leadership of President Hoover to avert a period of depression and serve to maintain higher levels of employment and business will undoubtedly benefit the construction industry which is the second largest in the country. Business men in the middle west are still optimistic.

C. G. Borchert, President, Associated Equipment Distributors.



F. H. Moore, Secretary-Treasurer, Equitable Asphalt Maintenance Co., Kansas City, Mo.



E. T. Tuller, Vice Pres., Transit Mixers, Inc., San Francisco, Calif



Edwin F. Hill, Jr., Sales Mgr., Transit Mixers, Inc., San Francisco, Calif.



M. R. Butler, Pres. & Gen Mgr., Butler Bin Co., Waukesha, Wisc.



A. R. Morten, Vice Pres. in Charge of Sales & Advertising, Butler Bin Co., Waukesha, Wisc.



K. H. Talbot. Director of Re-search, National Equipment Corp., Milwaukee, Wisc.



Clarence E. Bement, Vice President and General Manager, Nevo Engine Co., Lansing, Mich.



S. M. Hunter, Sales Manager, Novo Engine Co., Lansing, Mich.



E. B. Mallery, Vice President, Climax Engineering Co., Clin-ton, Iowa



C. P. Smith, President, Smith Engineering Works, Milwaukee, Wisc.

The conferences at Washington called by President Hoover have developed the fact that the construction industry is in a healthier condition and the work to be done in 1930 will be prosecuted with efficiency and dispatch. Construction projects for 1930 should far exceed those undertaken and completed during 1929.

Samuel Eckels, Pres., American Association of State Highway Officials.



S. F. Beatty, President, Austin-Western Boad Machinery Co., Chicage, Ill.



C. R. Raquet, Sales Mgr., De-troit Steel Products Co., De-troit, Mich.



Morgan Ramsay, Sales Mgr., Bay City Shovels, Inc., Bay City, Mich.



C. N. Maurer, Dir., Highway Sales Div., The Heil Co., Mil-waukoe, Wis.



Frank Moore Studio G. L. Harman, Brownhoist Corp., Ohio



W. S. Railsback, President, New England Road Machinery Co., Boston, Mass.



C. P. Reuter, Mead-Morrison Mfg. Co., E. Boston, Mass.





A. W. Hodgkiss, Representative, Mfg. Div., Warren Brothers Roads Co., Chicago, IB.



J. G. Miller, Vice-Pres. & Sales Mgr., The Baker Manufacturing Ce., Springfield, Ill.



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D. C. Penner, Mgr., Public
Works Dept., Mack Trucks,
Inc., New York, N. Y.



Underwood & Underwood
W. B. Greene, Vice Pres., Barber-Greene Co., Aurora, Ill.



Frank F. Hase, President, C. H. & E. Manufacturing Co., Inc., Milwaukee, Wisc.



L. W. Glaser, Sales Manager, Littleford Bros., Cincinnati, O.



Earl D. Stearns, Vice President, Fairfield Engineering Co., Marion, Ohio



P. A. Orten, Jr., Vice President & Sales Manager, Orten Crane & Shovel Co., Chicago, Ill.



C. J. Hug, President, The Hug Co., Highland, Ill.



Boger S. Littleford, Littleford Bros., Cincinnati, Ohio

In business depressions the great thing to do is to restore confidence. The President will be successful in this. He has started a coordination of industry that will be effective in establishing sound business, aided by an abundance of credit at easy rates. I believe the volume of construction work in 1930 will equal 1929.

Henry C. Turner,
President, Turner Construction Company, New York.



H. D. Van Doorn, Assistant Manager, Trackson Co., Milwaukee, Wisc.



Henry N. Schramm, President, Schramm, Inc., West Chester, Pa.



A. O. Witt, Manager, Sales Promotion, Schramm, Inc., West Chester, Pa.



L. E. Dauer, Sales Mgr., Trackson Co., Milwaukee, Wisc.



W. H. Stiemke, Vice President & General Manager, Trackson Co., Milwaukee, Wisc.



D. J. Carsen, Vice Pres. & Gen. Mgr., H. Brewer & Co., Tecumseh, Mich.



Photo by Blank & Stoller J. S. Helm, Gen. Mgr., Asphalt Sales Dept., Standard Oil Co. of N. J., New York, N. Y.



Louis J. Rogers, Vice President, Rogers Bros. Corp., Albion, Pa.



Charles A. Rogers, President, Rogers Bros. Corp., Albien, Pa.



R. O. Perrott Philadelphia, Pa.

I think the conferences which have been going on at the White House are having a very helpful effect on the business situation throughout the country. After the hysteria through which Wall Street went, I think it was fine psychology to have had the business leaders in the country meet and express their opinions, as I understand they did, in the most optimistic vein.

Herbert L. Pratt, Chairman of the Board, Standard Oil Co. of New York.



Hugh L. Rogers, Secretary, Rogers Bres. Corp., Albion, Pa.



C. E. Punk, Eastern Sales Mgr., Concrete Machinery Co., Waterloo, Iowa



A. R. Ellis, Vice Pres., Pittsburgh Testing Laboratory, Pittsburgh, Pa.



Ernest Schaefer, Secretary and Sales Manager, The Gustav Schaefer Co., Cleveland, Ohio



Photo by Blank & Stoller

J. E. Pennybacker, Managing
Director, The Asphalt Institute, New York, N. Y.



J. B. Wemlinger, President, Wemlinger, Inc., New York, N. Y.



W. M. Neill, Sales Manager, Bates Valve Bag Corp., New York, N. Y.



W. E. Barbour, Sales Manager, Domestic Engine & Pump Co., Shippensburg, Pa.



E. G. Carr, Ted Carr & Co., Chicago, Ill.



H. M. Davison, Excavator Sales Mgr., Harnischfeger Sales Corp., Milwaukee, Wisc.



Wm. H. Hassenplug, Asst. Excavator Sales Mgr., Harnischfeger Sales Corp., Milwaukee, Wisc.



L. N. Ridenour, Asst. Excavator Sales Mgr., Harnischfeger Sales Corp., Milwaukee, Wisc.



Frank Moore Studio

Lion Gardiner, Vice Pres., Lakewood Eng. Co., Cleveland, Ohio



J. D. Abram, President, Abram Cement Tool Co., Detroit, Mich.



Shelby E. Race, Treas. and Sales Manager, Lansing Co., Lansing, Mich.



C. A. Luster, President, Clyde Iron Works Sales Co., Duluth, Minn.



J. T. Frost, General Sales Manager, Clyde Iron Works Sales Co., Duluth, Minn.



C. M. Ballard, Sales Manager, Williamsport Wire Rope Co., Chicago, Ill.

The White House conferences have helped to make clear to all the fundamental soundness of American industry. The Western Electric Company has in hand an extensive program of enlargement of its manufacturing facilities, inaugurated last year, and this will be carried out as planned with an expenditure of upwards of \$50,000,000 during 1930.

Edgar S. Bloom, President, Western Electric Company.



W. S. Godwin, President, W. S. Godwin Co., Baltimore, Md.



Alexander F. Jenkins, President and Treasurer, The Alexander Milburn Co., Baltimore, Md.



G. R. Harris, General Manager, The Miami Trailer-Scraper Co., Trow, Ohio



Wm. C. Harris, Sales Mgr., The Miami Trailer-Scraper Co., Troy, Ohio



N. S. Greensfelder, Advertising Manager, Hercules Powder Co., Wilmington, Del.



Photo by Blank & Stoller Charles S. Ackley, Vice Pres. in Charge of Sales, Mc-Kiernan-Terry Corp., New York, N. Y.



Earle E Evans, Vice Pres., in Charge of Field Operations, McKiernan-Terry Corp., New York, N. Y.



Chester H. Lehman, General Sales Manager, Blaw-Knox Co., Pittsburgh, Pa.



Edward M. Ornitz, Sales Manager, Road Building Dept., Blaw-Knox Co., Pittsburgh, Pa.



H. F. Kanauer, Sales Man-ager, Commercial Division, Highway Trailer Co., Edgerton, Wisc.

I am daily getting tangible evidence of the present and prospective stimulating effect of the Hoover Business Conference. This, coupled with the release of money for construction purposes, together with a real need for continuous public works, in my opinion, portends a good long healthy active construction season for 1930.

H. C. Beckwith, President and General Manager, Byers Machine Co.



Paul Johnson, Gen. Sales Man-ager, Barnes Manufacturing Co., Mansfield, Ohio



C. D. Fleming, Vice President & General Manager, Cleveland Tractor Co., Cleveland, Ohio



Photograph by Bachrach
H. E. Orr, Adv. Mgr., Cleve-land Tractor Co., Cleveland,
Ohio





W. B. Knickerbocker, President, The Knickerbocker Co., Jack-son, Mich.



C. B. Messinger, President, Chain Belt Co., Milwaukee, Wisc.



A. L. Shaw, President, Chicago Automatic Conveyer Co., Chi-cago, III.



C. L. Mundy, Pres. & Gen. Mgr., J. S. Mundy Hoisting En-gine Co., Newark, N. J.



B. P. Page, Jr., President, The Autocar Co., Ardmere, Pa.





A. M. Shenk, President and General Manager, McEverlast, Inc., Los Angeles, Calif.



Lee S. Trainor, Chicago Dis-trict Mgr., McEverlast, Inc., Los Angeles, Calif.



C. A. Hines, Secretary, The Roderick Lean Co., Mansfield, Ohio



Frank H. Smith, Sales Manager, The Roderick Lean Co., Mans-field, Ohio



F. H. Edson, Pres., The John Lauson Manufacturing Co., New Holstein, Wisc.



W. R. Meadows, President, W. R. Meadows, Inc., Elgin, Ill.



J. P. Gilson, Pres. & Gen. Mgr., Gilson Bros. Co., Fredonia, Wisc.



Photo by Blank & Stoller Allan Jackson, Director & Vice. President of Marketing, Standard Oil Co. of Ind., Chicago, Ill.



I. E. Jones, Vice President, Caterpillar Tractor Co., San Leandro, Calif.

It is a fact that a crisis in the stock market has in the past generally resulted in a depression of business. It is also a fact that the general conditions surrounding the present crisis are most exceptional and more or less without precedent in that they are entirely favorable to a continuation of business upon a sound basis. There is no reason why the effect of the stock market deflation should do more than temporarily retard business and we look forward to 1930 with confidence that it will be a normal year.

W. W. Coleman, President, Bucyrus-Erie Company.



T. M. Deal, Secretary and Sales Manager, Speeder Machinery Corp., Cedar Rapids, Iowa



H. H. Chambers, Sales Mgr. Western Div., Caterpillar Trac-tor Ce., San Leandro, Calif.



Donald Williams, Assistant Sales Manager, Dow Chemical Co., Midland, Mich.



E. C. Leach, President, The Leach Co., Oshkosh, Wisc.



Hartsook Studio H. W. Parsons, Asst. Sales. Mgr., Speeder Machinery Corp., Cedar Rapids, Iowa



G. D. Finney, Sales Manager, Grader Dept., Rome Mfg. Co., Rome, N. Y.



J. M. Patterson, General Manager, Grader Dept., Rome Manufacturing Co., Rome, N. Y.



Frank B. Phinney, N. E. Manager, Universal Road Machinery Co., Kingston, N. Y.



A. B. Shufeldt, General Manager, Universal Road Machinery Co., Kingston, N. Y.



George G. Curd, District Sales Manager, Northwest Engineering Co., Cincinnati, Ohio

The Hoover conferences and probable building of secondary roads as a Farm Relief Measure have inspired confidence on the Pacific Coast and our experience already indicates increased activity in the construction field which will break all previous high records during 1930 and succeeding years.

Edward R. Bacon, President, Edward R. Bacon Company, San Francisco.



W. S. Miller, Secretary & Sales Manager, Hardsocg Wonder Drill Co., Ottumwa, Iowa



A. J. La Gess, Vice Pres. & Dir. of Sales, Portable Power Teol Corp., Warsaw, Ind.



Arthur S. Hughes, President, The Hughes-Keenan Co., Mansfield, Ohio



Howard E. Sneathen, Director of Truck Sales, Dodge Brothers Cerp., Detroit, Mich.



A. C. Plothow, Pres., Everhot Manufacturing Co., Maywood, Ill.



Joe L. Long, Chicago Representative, E. D. Etnyre & Co., Inc., Oregon, III.



T. D. Harter, Assistant General Manager, G. H. Williams Co., Erie, Pa.



Oliver F. Rinderle, President-General Manager, Brown Clutch Co., Sandusky, Ohie



William I. Buhl, President, The Buhl Co., Chicago, III.



E. S. Cooper, Pres., Independent Pneumatic Tool Co., Chicago, Ill.



M. J. Harkless, Mgr., Contractors Dept., Independent Pneumatic Tool Co., Chicago,



Bennett S. Chapple, Jr., Development Dept. of Sales Div., The American Rolling Mill Co., Middletown, Ohio



G. P. Ahlbrandt, Gen. Mgr. of Sales, The American Bolling Mill Co., Middletown, Ohio



Larry Hess, Advertising Manager, Jes. Honhorst Co., Cincinnati, Ohie



Arthur R. Miskin, Manager, Miskin Scraper Works, Ucon, Idaho



C. L. Brown, President and General Manager, Northfield Iron Co., Northfield, Minn.



Franklin D. Hooper, Sales. Manager, Lidgerwood Manufacturing Co., Elizabeth, N. J.



J. F. Richardson, Secretary and Sales Managor, Luffalo-Springfield Roller Co., Springfield, O.

The business situation in the United States is sound and there is no need to fear a serious or protracted depression. Much has been done to restore confidence by the conferences which President Hoover has held in Washington with leaders in major fields on economic activities. These discussions have emphasized the vast programs of industrial rebuilding and expansion that lie ahead.

-From the Monthly Review of Economic Conditions, National City Bank of New York.



A. C. Vicary, Vice President, Bucyrus-Erie Co., Erie, Pa.



M. L. Pulcher, President, Federal Motor Truck Co., Detroit, Mich.



Photograph by Bachrach Geo. D. Wilcox, Merchandising Manager, Federal Motor Truck Co., Detroit, Mich.



Lyman W. Close, Vice President & Sales Manager, The Toledo Pressed Steel Co., Toledo, Ohio



J. A. Garber, Assistant Sales. Manager, Bucyrus-Erie Co., South Milwaukee, Wisc.



D. D. Guilfoil, Vice-President-General Sales Manager, Sauer-man Bres., Inc., Chicage, Ill.



O. L. Dent, Pacific Coast Manager, Bansome Concrete Machinery Co., Dunellen, N. J.



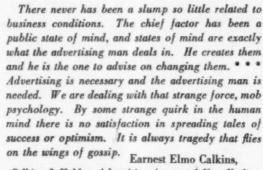
H. C. Peters, Midwest Manager, Ransome Concrete Machinery Co., Dunellen, N. J.



A. P. Robinson, Sales Manager, Ransome Concrete Machinery Co., Dunellen, N. J.



W. L. Schumacher, Vice President and Treasurer, Toledo Wheelbarrow Co., Toledo, Ohio



Calkins & Holden, Advertising Agency of New York.



J. Otis Pierce, Vice Pres. in Charge of Sales, Brown-Lipe Gear Co., Syracuse, N. Y.



H. C. McCardell, President, The Parsons Company, Newton, Ia-



N. DeWind, General Sales Man-ager, The Parsons Company, Newton, Iowa



H. E. Chilcoat, Manager of Sales, Air Dump Car Division, Koppel Industrial Car & Equip-ment Co., Koppel, Pa.



H. W. Redman, Chicago Sales Manager, Koppel Industrial Car & Equipment Co., Koppel, Pa.



G. M. Fish, Western Sales Mgr., Construction Machinery Co., Waterloe, Iewa



R. C. Weller, Gen. Sales Mgr., Construction Machinery Co., Waterlee, Iowa



J. N. Heltzel, President and Treasurer, Heltzel Steel Form & Iren Co., Warren, Ohio



W. J. Savage, Vice President and Sales Manager, Heltzel Steel Form & Iron Co., War-ren, Ohio



W. A. Gordon, Sales Manager, General Wheelbarrow Co., Cleveland, Ohio



Howard O. McMillan, President, M & M Wire Clamp Co., Minneapolis, Minn.



Wallace B. Conant, Pres. & Treas., Conant Machine & Steel Co., West Concerd, Mass.



H. J. Klingler, Vice Pres. & Gen. Sales Mgr., Chevrolet Moter Co., Detroit, Mich.



S. E. Barlow, Chairman of Board, Huber Manufacturing Co., Marion, Ohio



H. G. Simpkins, Mgr., Road Machinery Div., Wisconsin Foundry & Machine Co., Madison, Wisc.



P. L. Crittenden, Vice Pres. & Gen. Mgr., National Brake & Electric Co., Milwaukee, Wisc.



Paul C. La Blant, Vice Pres. in charge of Sales, M W Labricants Corp., Minneapolis, Minn.



S. Jones Philips, President, Good Roads Machinery Co., Inc., Kennett Square, Pa.

One of the results of the speculative period through which we have passed in recent months has been the diversion of capital into the security market with consequent lagging of the construction work in the country. * * * Any lack of confidence in the economic future or the basic strength of business in the United States is foolish. Our national capacity for hard work and intelligent cooperation is ample guaranty of the future.

—From President Hoover's Call for the Business Stabilization Conferences.



B. C. Briody, Vice President & Manager, Highway Division, Truscon Steel Co., Youngstown, Ohio



Earle S. Philips, Vice President, Good Roads Machinery Ce., Inc., Kennett Square, Pa.



J. H. Watters, Pres. & Gen. Mgr., Marion Steam Shovel Co., Marion, Ohio



D. J. Shelton, Vice Pres. in Charge of Sales, Marion Steam Shovel Co., Marion, Ohio



Harvey T. Gracely, General Sales Manager, Marion Steam Shovel Co., Marion, Ohio



Photo by Bachrach C. V. B. Fullenwider, Manager, Elastite Prod. Div., The Philip Carey Co., Cincinnati, Ohio



Lorimer Dunlevy, President, Muskegon Pump & Generator Co., Muskegen, Mich.



Blaine S. Smith, President, Pennsylvania - Dixie Cement Corp., New York, N. Y.



John H. Earle, Sales Manager, Fuller & Sons Manufacturing Co., Kalamasoe, Mich.



S. J. Hunt, Sales Manager Wiard Plew Co., Batavia, N. Y.



Louis Wiard, Pres., Wiard Plow Co., Batavia, N. Y.



Frederick W. Allan, Wiard Plew Co., Batavia, N. Y.



W. McK. White, Pres. & Gen. Mgr., Chausse Oil Burner Co., Elkhart, Ind.



Harry L. Horning, President, Waukesha Motor Co., Waukesha, Wisc.



Jehn A. Roet, President, Pate-Root-Heath Co., Plymouth, Ohio



R. T. Beebe, President, Beebe Bros., Seattle, Wash.



Frank H. Dewey, General Manager, Wood Hydraulic Hoist and Body Co., Detroit, Mich.

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Arnold Nelson, Sales Manager, N. P. Nelson Iron Works, Pas-saic, N. J.



A. C. Picard, General Manager, Lubricator Div., McCord Radi-ator & Mfg. Co., Detroit, Mich.



Edwin F. Jones, Sales Mgr., Erie Steel Construction Co., Erie, Pa.



G. W. Breiel, Managing Director, Armco Distributors' Assn. of Amer., Middletown, O.



B. S. Arthur, Sales Mgr., Aeroil Burner Co., Inc., Chicago, Ill.



Marie J. Root, Secy.-Mgr., Boot Spring Scraper Co., Kalamazoo, Mich.



John S. Boyd, Vice Pres. in Charge of Sales, Galion Iron Works & Mfg. Co., Galion, Ohio



J. B. Bakstad, Mgr., Crusher Sales, Jeffrey Manufacturing Co., Chicago, Ill.



L. R. Wilson, Mgr., Truck Body Sales, C. O. Bartlett & Snow Co., Cleveland, Ohio

Minnesota Lets Contract for 138 Miles of per mile of 20-foot slab built in 1929 was \$24,333. Concrete for 1930 Construction

CCORDING to figures given out by the Minnesota State Highway Department, contractors are bidding an average of \$96 less per mile for 20-foot concrete pavement for 1930 construction than for that built in 1929. Bids were opened on October 29, 1929, for 138 miles of pavement to be built during the coming year. Of this, 134.1 miles are to be 20 feet wide and the total of the low bids was \$2,215,703 or an average of \$16,522 per mile. One 3.9-mile stretch of 27-foot pavement will cost \$93,807.

The contractor's figures include all labor and materials except cement which is furnished by the state. The bids on next year's supply of cement shows that this item will cost an average of \$7,715 per mile for 20-foot pavement, making a total of \$24,237 per mile for the completed slab. The average cost

Ventilation of Vehicular Tunnels

BOOKLET entitled "Ventilation of Vehicular Tunnels" has recently been published by its author, Ole Singstad, Chief Engineer and Superintendent, New York and New Jersey Bridge and Tunnel Commissions. This is a reprint of a paper presented by Mr. Singstad before the World Engineering Congress held in Tokyo, Japan, in November, 1929.

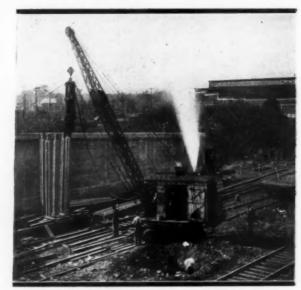
The book contains a very brief historical sketch of the development of tunnels and the problems of ventilation connected with their use, and then devotes the remainder of its pages to a rather detailed description of the methods used in ventilating the Holland Tunnel under the Hudson River, New York, as well as brief mentions of methods used in other modern tunnels.

Building a Railway Station

in Close Quarters

By J. Buckley Bryan

Construction Superintendent, United Engineers & Constructors, Inc.



Driving the Precast Concrete Piles for the Pier



NOTHER instance of the utilization of railroad air rights is found in the new up-town Delmar Passenger Station of the Wabash Railway Co., at St. Louis, Mo. The structure, which has been completed recently, was built over the Wabash tracks immediately adjacent to the Delmar Boule-

vard Viaduct.

Approximately 200 tons of steel were required for the project, of which all but a small percentage was used in the bridge, or deck, on which the station proper is constructed.

Although by no means a massive structure, no expense was spared to make the station as complete as the best of domestic and foreign materials could make it.

The new building proper is constructed of granite, limestone and brick, with red French tile roof. The architecture is of the Ionic order, with shafts of columns plain rather than fluted, as in the Roman Ionic.

Above the main entrance between architrave and cornice appears the inscription, "Wabash Railway Company," and immediately above the latter the inscription, "Delmar Station," will appear. The bronze iridium letters of those inscriptions are the best procurable, having been imported from Birmingham, England, where they are made by the Birmingham Guild, Ltd., by a specially patented process.

The interior of the station is finished in marble, ornamental plaster and ornamental brass and bronze. The walls are of travertine marble with trim of black and gold. Both of these marbles are imported from Italy. The travertine is volcanic in origin and no really good deposits of it have been found in this country. It is

much desired by architects, but, due to its cost, is many times imitated in plaster, and some of our most modern public buildings have walls and columns of such travertine. All of the marble and other materials of the new Delmar Station are genuine. The marble floors are of Tennessee pink, a domestic marble of noted durability. The borders and bases are of black and gold marble. The corridors and ladies' retiring room have travertine walls to wainscot height, with plaster above.

The solid bronze drinking fountain at one end of the waiting room, combining bubbler and dolphin head, is set in a panel of Georgia green marble, formerly known as Vert Antique. The ticket counter, apron and panel beneath are of Hauteville marble. The ticket window is of solid bronze with bronze baggage rack. Bronze train schedule boards are recessed in the wall on each side of the ticket window.

Radiator enclosures in the waiting room are of marble with solid bronze grilles top and front. The waiting room, with four double solid oak settees with artistic bronze reading lamps affixed, accommodates 72 people.

Instead of the usual walls and partitions of marble in the washrooms, Carrara glass has been used; the walls are laid up with Frostex ashlar, and the trim, stiles, coved base, etc., are of black Carrara glass. This is the first installation of its kind in St. Louis. The black and white combination gives a very pleasing effect from an architectural standpoint, and from a sanitary standpoint it is desirable for public buildings.

All these facilities are at the viaduct or upper level. Access to the lower or track level is by means of stairways and elevator. The latter is of the full automatic type and is a combination freight and passenger elevator. The stairway windows are of the Norman type with stationary steel sash. The terra cotta is gray in

color, to match the limestone of the station, and is of rustic design.

The roofs of stair enclosures are covered with Colorblende asbestos shingles, which give a very pleasing effect and harmonize with the red French tile roof of the station.

Platform coversheds, each 300 feet long, connect with the stair enclosures. The platforms themselves are each approximately 1,000 feet long, 220 feet being under the viaduct and station.

HEATING SYSTEM

The boiler room is at track level and is equipped with an automatic oil burner. The heating system is of the differential vacuum type and of a capacity sufficient to supply the necessary radiation for the station and to heat sleeping cars which the Wabash Railway Co. contemplates placing at the Delmar Station so that passengers so desiring may entrain at that point rather than be put to the inconvenience of going downtown to the Union Station. The sleepers then would be added to the trains upon their arrival at the Delmar Station.

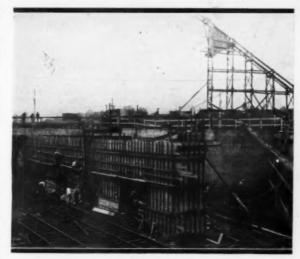
A large baggage room is also at the track level and connects by elevator with the upper baggage rooms at the street level.

The Delmar Station is easily reached by surface cars, which pass by the entrance. For the convenience of those arriving in automobiles, a paved approach 22 feet wide has been constructed past the main entrance so that machines may drive off the viaduct from the east, discharge or take on passengers at the station, and drive out again onto the viaduct. This private loop is entirely on railroad property, and solely for the use of patrons.

Some interesting construction problems presented themselves in the building of the passenger station, due to the necessity of preserving uninterrupted train service over the mainline and freight tracks spanned by the new edifice.

SITE AND GENERAL FEATURES

The construction of a new Delmar Passenger Station immediately followed the construction by the city of



Forms Erected for the Center Pier. At the Right Also Will Be Seen the Inclined Concrete Hoist Which Proved Very Effective

St. Louis of the Delmar Boulevard Viaduct which eliminated the grade crossing concerning which a 14-year controversy was waged between the city and the Wabash Railway Co. A minimum depression of the tracks of the latter railway, and an allowance of a minimum clearance of 18 feet between top of the rail and the reinforced concrete deck of the viaduct above having finally been agreed to, the railroad right of way was bridged by a two span reinforced concrete deck, the mainline tracks passing between the east abutment and an arched center pier, and the two freight tracks located between the center pier and the west abutment. At the time of constructing the viaduct, the abutments were extended to the north to serve in the dual role of retaining walls and as supports for the deck upon which the proposed new station and its approach were to be built.

The station approach, or drive, connected with and immediately adjacent to the public viaduct, is of simi-



The Temporary Girders in Place for Hanging the Forms for the East Half of the Viaduct Deck



The Specially Built Anchor Post Fence Between Tracks So Made That Any Panels Can Be Removed for Track Maintenance

lar construction to the latter, i.e., entirely reinforced concrete. The deck supporting the station proper, however, is of structural steel, supported by the concrete abutments, center pier (extended later for that purpose), and numerous steel columns. All of the steel was subsequently fireproofed by encasing in concrete.

FOUNDATIONS

The plans as originally developed by the Wabash Railway Co., followed the precedent established by the city of St. Louis in carrying the foundations to bedrock, approximately 40 feet below track level. An examination of the borings by the contractor, however, led to the suggestion that a comparative economic study be made of piers to bedrock versus precast concrete piles.

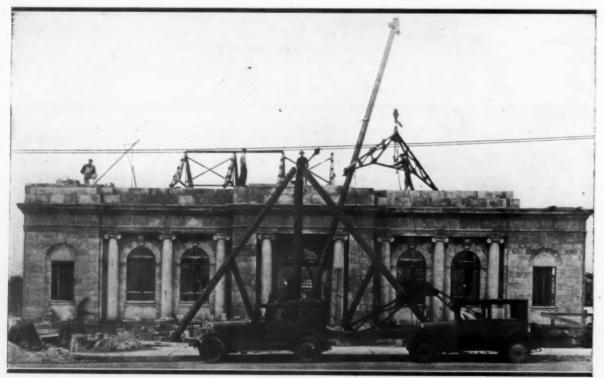
It developed that an appreciable saving might be effected by revising the foundation plans and employing 25-foot Smith-Brennan precast concrete piles to carry the loads.

The matter of non-interference with railroad operation being of paramount importance, it was essential that the equipment used for driving the piles be quite flexible, so that the tracks might be cleared at all times for approaching trains. A pilot, or flagman, was supplied by the railroad, whose province it became to warn of the approach of trains, give information as to specials, rerouting of trains, periods during which the track or tracks might be temporarily fouled, etc. This service proved extremely efficacious throughout the job, and greatly facilitated the work of pile driving, steel erection and stripping of forms, chuting concrete, erection of blast plates and many other operations.

Instead of the usual cumbersome pile driver with leads, an Erie Type B crawler steam shovel equipped with a crane boom was employed with a steam driven hammer suspended from the boom, and the piles held in a frame as shown in an accompanying photograph. This arrangement proved very satisfactory and it is noteworthy that not only in the case of pile driving, but also in connection with the numerous construction operations throughout the job, which involved the temporary fouling of the tracks, not a single train was delayed, nor the efficient operation of the railroad interfered with in any manner.

STRUCTURAL STEEL

From an erection standpoint, the project was an ideal one. Practically all of the steel, approximately 200 tons, went into the deck and its supporting columns, and with four tracks directly underneath, it was a comparatively simple matter to set the girders and beams



Erecting Roof Trusses with Stiff Leg Derrick Used in Setting Cut Stone of Facade



The Front Elevation of the Delmar Passenger Station on July 30, 1929

with a locomotive crane. The use of the tracks was of course restricted to certain periods since the mainline had to be cleared for all trains, but with the help of a pilot and conveniently located switches, this was a simple matter.

Stairway steel and the structural steel framing of platform coversheds were handled in like manner from each of the mainline tracks in turn.

Roof trusses and purlins were erected with a stiff leg derrick conveniently located on the viaduct in front of the station for erection of the granite and limestone, and subsequently used by the steel erector.

FORMS AND CONCRETE

In the matter of forms for concrete, no shores or bracing could be placed in a position that would bring them within the standard clearance envelope as required by the Interstate Commerce Commission of all railroads. All forms coming over the tracks had to be suspended. No shores of any kind could be used. This was a comparatively easy matter in the case of the structural steel deck on which the station proper was to be built, but in the case of the two 40-foot reinforced concrete spans of the drive or approach it was necessary to use five steel girders 3 feet deep and 46 feet long to support the combined weight of forms and concrete.

The west span was poured first, the temporary girders being blocked up high enough to permit carpenters and concrete men to prosecute their work with facility. The forms were suspended by means of %-inch through bolts, the latter being fastened at their upper ends to wales placed transverse to the girders and bearing on the upper flanges of the girders. The girders were later skidded across to the east span and the same arrangement utilized.

In the early stages of concrete work, especially for the pouring of piling caps, elevator pit and center pier, commercial ready-mixed concrete was used. This concrete was mixed at a nearby plant and transported to the job in specially constructed trucks which kept the concrete constantly agitated or mixed by means of a rotating baffle or drum. This method was later dispensed with on account of delays due to traffic jams or other hold-ups between the plant and the job, augmented by the unsatisfactory check on the water-cement ratio under which specifications the concrete was poured.

A 2-bag mixer was installed, and in lieu of the usual tower, a hopper was constructed at the top of an inclined plane, the mixer being placed at the bottom, at which point it discharged into a skip which was drawn up the inclined plane to the hopper by means of a cable attached to the drum of a gasoline hoist below. From the hopper the concrete was conveyed to the forms by the usual system of chutes. This arrangement obviated the necessity of constructing the relatively high tower and longer chute line which would have been required had the usual vertical hoist been employed, it not having been feasible to locate the mixer closer to the operation than the location selected.

HANDLING THE GRANITE AND LIMESTONE

The station deck made a convenient platform on which to hoist the granite for the base of the new building. The cars containing the stone were spotted on one of the freight tracks beneath the deck and the blocks lifted therefrom by means of a breast derrick, and subsequently set with the same equipment.

A stiff-leg derrick with boom was erected on the west span of the viaduct deck immediately in front of the station, and practically all of the limestone set there-

Instead of delivery on cars at the site, it was found more expeditious to ship the limestone to the yard of the St. Louis Cut Stone Co., nearby, unload the stone onto skips and truck the latter to the job as required. The skips were then unloaded from the trucks by the derrick, thus eliminating considerable individual handling of pieces.

The shafts of the columns were monolithic, and were set as was the rest of the limestone, with Lewis pins.

The back of all cut stone was painted with a dampproofing paint and a ½-inch thick waterproof parging plastered on.

BRICKWORK AND TERRA COTTA

The rear walls of the station were built of face brick laid up in Flemish bond, with full leader every sixth course. Jack arches were constructed over all openings.

Interior baggage room walls were also of face brick laid up in common bond with a protective dado of ¼-inch boiler plate encircling the room to a height of 4 feet as a protection against trunks and other heavy baggage.

The stairway enclosures are of architectural terra cotta, gray in color to match the limestone of the station proper.

In order to preserve railroad clearance, the exterior work had to be prosecuted on scaffolds suspended from the structural steel framework of the enclosures.

(Continued on page 138)



A View of the Stairs to the Loading Platforms and the Station Itself Looking Southeast

Fighting Muck

on a

Northern Indiana Road Job

By Byron R. Smith

Project Engineer,

Indiana State Highway Department



HE building of a concrete road over the lake sand and muck beds of northern Indiana presented many and various difficulties to the Calumet Paving Co., Gary, Indiana, during the construction of Indiana State Road No. 6, Project 104, Section A, extending from Missouri Street in East Gary

to 3 miles east of Lake County line, a distance of 7.684 miles, about half of which was new location. The contract was awarded on August 27, 1928, and work started on the clearing and rough grading September 2, 1928. The entire fall and winter up to the middle of January was utilized for rough grading over the muck beds and placing of structures before work was stopped for the winter. Work was again resumed on rough grading and placing of structures about the first of April, 1929, and pouring of the 20-foot 9-7-9-inch pavement was started May 17.

EXCAVATION

The total amount of excavation in the contract was approximately 76,500 cubic yards, of which approximately 3,500 cubic yards was special borrow. Due to the lowering of the grade and obtaining special borrow to take care of the settlement of the fills over the muck the total yardage was increased by 20 per cent. The major portion of the excavation in the heavy cuts was handled by a 1-yard Northwest shovel and ten to twelve hired trucks of 1-ton capacity, most of which were Chevrolets. A Caterpillar Sixty tractor drawing four 1½-yard Euclid self-loading wheel scrapers was used on the lighter cuts.

MUCK IN SPOTS

On this project there were three muck beds and owing to the variation in their depth and character of material each had to be handled in a different manner.

Approximately ½-mile from the beginning of the project was a muck bed about 1,300 feet in length and having an average depth of 5 feet. Here the muck was excavated to a width of 14 feet from the center line on the north side, and owing to the presence of a 6-duct underground concrete conduit owned by the American Telephone & Telegraph Co., excavation had to be lim-

ited to a width of 12 feet from the center line on the south side. The A. T. & T. forces which consisted of 12 men drove sheathing alongside the conduit and placed messengers from the top of the sheathing to nearby trees to hold the conduit in place during the backfilling and excavation operations. This work was carried out with a 1-yard Northwest crane equipped with a Keisler clamshell bucket. The contractor's forces consisted of a foreman, crane operator and two laborers.

The material for making the backfill was obtained by lowering the grade through a sand hill on each end of the muck bed and opening a borrow pit near the right of way on the west end. The crane was used to excavate the material for the backfill. Three 3-ton Dodge trucks equipped with Heil hydraulic hoists hauled the material and placed it by dumping from the end of the fill.

DYNAMITE STABILIZES FILL AT SECOND MUCK HOLE

The next muck bed encountered was near the center of the project, having a length of approximately 1,100 feet and an average depth of 14 feet. This muck bed being too deep to excavate, dynamiting was resorted to. The preliminary dynamiting consisted of placing one pound of 50 per cent dynamite every 4 feet along the center line and every 4 feet, in lines 8 feet each side of the center line. The holes were made to such a depth that the charge of dynamite was at least 4 feet below the surface of the muck and no less than 40 feet along the center line was shot simultaneously. This work was carried out by three men and an electric detonator.

Immediately following the preliminary dynamiting the fill was started with a base width of 25 feet and built to grade in 1-foot layers and each layer rolled with a 10-ton Huber roller. Then, without compacting, the fill was raised to approximately 6 feet above grade. During the next three weeks the fill was left to be accurately observed, in order to determine its penetration, amount of settlement and whether further dynamiting would be necessary. The penetration proved to be sufficient to carry the 6-foot earth overburden without any settlement whatever over the full length of the fill. A 1-yard shovel was then used to remove the 6-foot overburden, and the material used to widen the fill.

Special reinforcing, consisting of 1/2-inch round deformed bars, was placed transversely over this fill in Excavation,

Dynamite and Fill

Used to Combat

Muck Beds



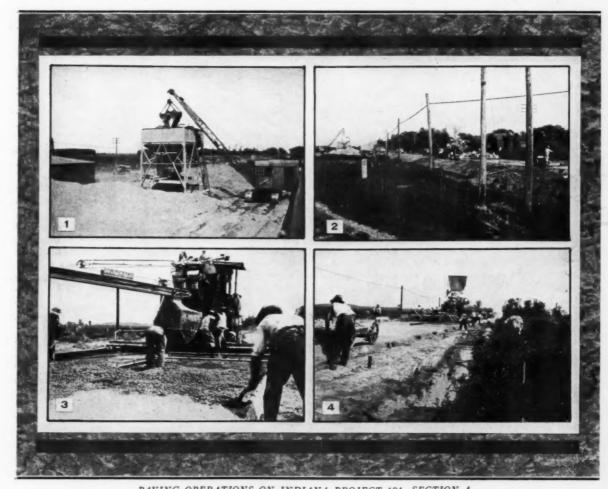
Special Reinforcing for the Concrete Slab Over a Muck Hole Showing Also the H-Beam Planer and the Pipe Template Dragged Behind the Paver

the pavement at intervals of 5 feet and longitudinal bars were spaced 26½ inches center to center.

THIRD HOLE REFUSED TO BE FILLED

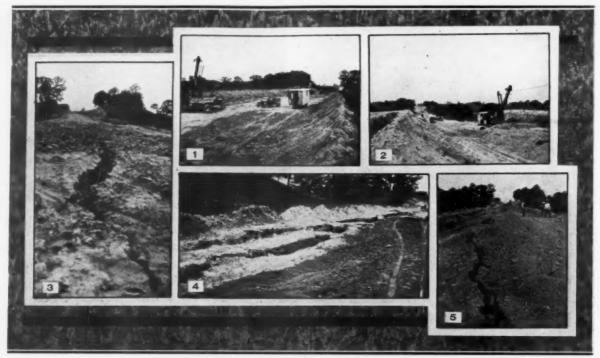
The next muck bed encountered was near the cen-

ter of the project, having a length of approximately 900 feet and an average depth of 30 feet. Here the preliminary dynamiting and filling was started in October, 1928, and continued until bad weather. This fill was started with a base width of 25 feet, placed in 1-foot



PAVING OPERATIONS ON INDIANA PROJECT 104, SECTION A

1. The unloading plant and cement shed, located 2½ miles from the east end of the project. 2. A general view of the complete paving and unloading outfit. 3. The 4/-E Rex paver and method of carrying on the work behind the paver. 4. The paver, finshing machine, hand finishing and a glimpse of the burlap truck.



FURTHER OPERATIONS IN THE BATTLE WITH THE MUCK

Two Northwest shovels lowering and widening a cut to obtain fill for two muck beds near the center of the project.
 Shovel working on grade and two trains hauling material to fill a muck hole.
 4 and
 Typical cracks in the fill over a muck hole.

layers and rolled. Trucks were used to haul the material to the fill for some time, but the fill settled so fast that it was hard to keep it high enough above water level to keep the trucks from working the water to the surface and making it soft, which made it very difficult for the trucks to haul over. In order to avoid this difficulty and also to speed up the job, another 1-yard Northwest shovel and an industrial outfit consisting of two Whitcomb gas locomotives and sixteen Western dump cars was brought in, and these operated in a very satisfactory manner. Eight men moved and raised the track, dumped the cars and did any leveling of the grade that could not be done with a team and marmon board. Including the operators of the equipment and teamster a total of fourteen men was used to carry out the work.

This fill was built to about 4 feet above grade and due to the continued slow settlement of the fill, a paving gap was left at this point.

FINAL GRADE AND FORM SETTING

A 10-foot Adams leaning wheel grader drawn by a Caterpillar Thirty tractor was used for the preliminary shaping up of the subgrade and grading out the form line as near as possible to grade. When it became necessary to correct any high or low grade, a Lakewood rooter and a rotary fresno scraper operated very satisfactorily when used in connection with the tractor. Three men handled this equipment, and with the assistance of the four men who did the necessary hand work on the form trenches, pulled the Lakewood subgrader for the final finishing of the subgrade.

When any compacting of the subgrade or form line was necessary, one of the men working on the subgrade operated the 4-ton Austin double gear roller.

In order to have plenty of subgrade and forms ahead of the mixer at all times, a stock of 1,600 road feet of Metaforms was placed on the job. Two men on each side set them to line and grade and did any relining that was necessary after the subgrader has been pulled.

A home-made planer made from a 8 x 8-inch H-beam with subgrader blades fastened on one face, and having an angle iron approximately 30 inches long on each end acting as a guide and support to hold it on the forms, was drawn along by the Rex 27-E paver and operated very satisfactorily toward removing any variations that was left by the subgrade or trucks. Immediately behind the planer and drawn along with it was a template made from a 4-inch pipe having teeth 34-inch in diameter spaced at 1-foot intervals and set 1/8-inch above grade. When these teeth marked the subgrade, it was corrected sufficiently to allow the template to pass over without marking when rechecked.

AGGREGATE AND UNLOADING PLANT

The sand and gravel passed state inspection at the producing plant of the Chicago Sand & Gravel Co., who furnished the material for this project. The material was shipped via E. J. & E. Railway to the contractors siding at the job and unloaded to the stock pile or direct to the Butler steel bins with a Moore Speedcrane equipped with a Keisler 1-yard clamshell bucket. This work was carried on by the crane operator and one helper used to spot the bucket in the car.

Three 3-ton Dodge trucks equipped with Heil hydraulic hoists and fifteen hired trucks which were mostly Chevrolets, were used to haul the batches to the mixer. The empty truck went first to the batcher and received

the aggregate for a batch and drove about 75 feet away to the cement shed and there received 7 bags of Universal portland cement which was placed on top of the aggregate and then drove away to the mixer, a maximum haul of $2\frac{1}{2}$ miles and a minimum of 50 feet. Four men cut the wires and dumped the cement on top of the aggregate within 200 feet of the mixer.

The cement was hauled direct from the mill by six 5-ton trucks and it required six to eight men to unload it to the platform and place it on the batch trucks.

CONCRETING

Approximately 300 feet ahead of the mixer one man operated the Freeman turntable. One man dumped the trucks at the skip of the 27-E Rex paver and saw to it that all the material for the batch was removed from the truck into the skip and gave the driver a ticket for the batch. Two men were used to spade along the forms, spread the concrete uniformly over the subgrade and shovel to the screed of the Lakewood finishing machine which was used to strike off the concrete and do the final belting of the finished pavement. Immediately behind the finishing machine, which was operated by one man, were two men who did such hand work as was necessary to remove any variations that

might be left by the finishing machine. A 10-foot straight-edge was used for checking the pavement in order to determine the position of the high or low spots. A 5-foot float was used to remove any very noticeable variations and then a metal top float 10 feet long that was very rigid and did not warp or twist throughout the entire paving season was used to iron out any small variations that might be left, just before the final belting.

Two men were used to place the steel, one set the side dowels and oiled both the side dowels and the forms while the other one set the center strip and placed the cross dowels after each move of the mixer. Another man removed any loose dirt that was left along the forms and assisted the steel setter in checking the height of the center strip by stretching a string across the top of the forms over small blocks that give the desired height.

While the Kalman center strip was being pinned it was held in a vertical position in the center of the pavement by two jigs, one placed at each end, and extending from the center to form line on one side. At intervals of 5 feet, round deformed dowel bars \(\frac{5}{8} \)-inch diameter and 4 feet long were placed through the center strip to hold the two slabs of pavement together. These



OPERATIONS IN FILLING A STRETCH OF MUCK

1. A truck dumping from the end of the fill through the muck excavation near the beginning of the project. 2. The sheathing for holding the A. T. & T. Co. conduit in place during the muck excavation and backfilling operations. 3. A general view of one section of muck excavation partly backfilled. 4. Using a Novo pump to jet fills that could not be easily rolled.

dowels were held in position by metal chairs until the concrete was placed.

The side dowels consisted of ¾-inch smooth bars 20 feet long, lapped 24 inches and run the entire length of the job. These bars were painted and allowed to thoroughly dry before being brought out to be used.

CURING OF PAVEMENT

As soon as possible after the hand finishing and final belting of the pavement was done it was covered with strips of burlap and kept wet by sprinkling until the concrete had set up sufficiently to allow its removal and straight-edging of the pavement. The burlap was carried along on a home-made bridge mounted on automobile wheels which traveled on the forms. No grade was encountered where it was necessary to use more than two men to push the bridge along, place the burlap and do the sprinkling.

Immediately after the removal of the burlap the pavement was straight-edged and any variation shown in 10 feet of pavement was removed with a carborundum brick. Immediately following the straight-edging a generous amount of straw was uniformly spread over the pavement and kept wet by sprinkling. Generally six men were used to place the straw and sprinkle as the pavement had to be taken care of before 9 o'clock the following day. After this was done two or three of these men sprinkled all pavement not yet 14 days old, and the remainder pulled the forms and then banked dirt up against the edge of the pavement. After the curing period had expired the straw was removed and hauled ahead to be used again and the pavement opened to local traffic.

The water for curing and paving was supplied by a Novo pump and a 2½-inch pipe line having valves spaced at intervals of 200 feet, with 1½-inch valves to supply the mixer and ¾-inch for sprinkling connections.

FLEXURAL STRENGTH TESTS

When it was desired to open a section of pavement before the 14-day curing period had expired, two test beams were made from the concrete of the day's run governing the age of the section. These were 6 inches square and 4 feet long. These were placed along the edge of the pavement and cured in the same manner as the pavement for 10 days. At this time they were placed in a portable machine for making flexural tests and broken. The average modulus of rupture for eight breaks was 700 pounds, which was well above the minimum of 550 pounds required before the pavement could be opened.

Personnel

The contractor for this work was the Calumet Paving Co., Gary, Indiana, of which William Sykes is President and George Verplank, Secretary, Treasurer and Acting Superintendent. This work was done under the supervision of the Indiana State Highway Commission, W. E. Mendenhall, Field Engineer, B. R. Smith, Project Engineer and Owen Fye, Inspector.

Rebuilding the Mohawk Trail

the penetration was $2\frac{1}{2}$ gallons. Immediately following the penetration a gang of 10 men hand cast pea stone on the surface and the 12-ton rollers began rolling and continued until the stone was set firmly. Two men were also kept busy brushing the pea stone over places where the asphalt was visible. All contractors' trucks were

kept off the strip poured for 24 hours to insure the asphalt setting up with the maximum of interlocking of the stone from the rolling. The tires of heavy trucks were liable to cut up the pavement if run on too soon.

MISCELLANEOUS

After the roadway was complete the contractor still had several weeks of work ahead clearing up the shoulders and cutting down the bank in long stretches where it overhung the drains. For this work one of the Erie steam shovels was run along the edge of the pavement and cut the bank and loaded directly into trucks alongside.

There were 27,250 feet of cable guard rail erected along the side of the road on fills and at the edges of steep ravines. Two strands of 34-inch cable were used supported by triangular section reinforced concrete posts furnished by the Albany Sand & Gravel Co., Albany, N. Y.

PERSONNEL

The project was completed under the direction of the Massachusetts Department of Public Works, H. D. Phillips, District Highway Engineer. The State Engineers responsible for the work were W. J. Burns, Senior Engineer; F. E. Cassidy, Assistant Chief Engineer; E. J. Gorrie, Resident Engineer; and W. P. Lowler, J. J. McCarthy and Harold Tyrell. For the contractor, D'Onfro Bros., Inc., Leominster, Mass., Nicholas D'Onfro, President and Daniel D'Onfro, Treasurer, acted as their own Superintendents.

Steel Workers to Get Lift to Within 15 Stories of Their Day's Work

A N economic factor, known as man-power fatigue, has been forced into the calculations of construction costs by tall building operation where labor payment is an important item, according to a recent article in the Dow Service Daily Building Report.

The Structural Steel Board of Trade recently approved a rule that no structural steel worker employed, for example, to rivet beams and girders 30 or more stories above the street level, need climb more than 15 stories. The owner or contractor for a building is obligated under the ruling to provide elevator facilities for workmen up to within 15 stories of the point where steel is to be set.

Charles L. Eidlitz, Chairman of the Structural Steel Board of Trade, said: "Anyone who has tried climbing 20 or 30 stories without resting readily appreciates what this man-power fatigue amounts to, especially since no one, having performed a feat like that, would have physical stamina left in sufficient quantity to go to work immediately, much less attempt to work far out on the scary end of a girder dangling several hundred feet high in the wind. It is not only the half hour or more climbing that counts, but further loss piles up while these high-priced crews are getting themselves in physical shape to go to work after such exhausting climbs.

"In order to enforce this transportation requirement and not for the purpose of making a profit, members of the Structural Steel Board of Trade will insist hereafter in making a charge of one-half hour's climbing time per man on any operation where such transportation is not furnished by the builder to within 15 stories of the derrick location.

"This may seem like a radical action, but a study made recently showed that men climbing these heights not only consumed from one-half hour to one hour in higher buildings, but that after having made the ascent and regardless of their physical condition, they are very materially exhausted and are not in condition to work which again increases the accident factor."

Construction Features

of the World's

Largest Earth Dam



TEAM shovel excavation tromborrow pits, standard railway, dumping from trestle and washing into place combined are creating the largest high earth dam in the world near Columbia, S. C. The dam is being built to impound the waters of the Saluda River at Dreher Shoals for

the development of power by four 32,500-kw units, an initial installation of 174,000 horsepower that will produce 200,000 kw-hrs in a year of average river flow.

The dam will be 208 feet high from the average elevation of rock in the bottom of the river and will be 7,838 feet in length. The maximum width at the base will be 1,150 feet. An 18-foot paved highway will be built across the completed dam. This highway will form a connecting link in the state highway system of South Carolina. Clearing of the site for the dam began in April, 1927, and the contracts for power call for the completion of the project before September, 1930. The project is being built by the Lexington Water Power Co., Columbia, S. C., at a cost of \$22,000,000.

By the construction of this dam a lake 41 miles long and 14 miles wide at its widest point will be created. The lake will have a shore line of 520 miles and will contain 750 billion gallons of water. It is estimated that about 10 months' average flow of the river will be required to fill the lake. A spillway will be provided to pass excess water around the dam during floods. The spillway will be equipped with four Tainter gates each 25 feet high and 37 feet 6 inches wide, which will be able to release 28,800,000 of water per minute.

Four intake towers, each 30 feet in diameter and 223 feet high, will draw the waters from the lake into 16-foot steel penstocks. A fifth intake tower, 60 feet outside diameter and 223 feet high will draw the waters into a concrete arch conduit 48 feet in base width and 23 feet in height. This conduit was used during construction to divert the waters of the river. It is planned to use this diversion tunnel for two additional penstocks for the operation of two more power units that will make the ultimate installation of the development of 261,000 horsepower.

The estimated quantities of materials for the construction of the dam, power house and penstocks are: 11,000,000 cubic yards of earth, 636,000 bags of cement, 122,012 tons of stone and gravel, 62,000 tons of sand,

Huge Mound 1½ Miles Long
and 208 Feet High
Being Built by Semi-Hydraulic Fill
Near Columbia, S. C.

3,987 tons of steel pipe penstocks, 329 tons of reinforcing steel and 1,407 tons of structural steel.

300 TRAIN LOADS OF EARTH FILL PER DAY

The Arundel Corp., Baltimore, Md., subcontractors for the dam, has literally made dirt fly on this job. Borrow pits have been opened in four quadrants.

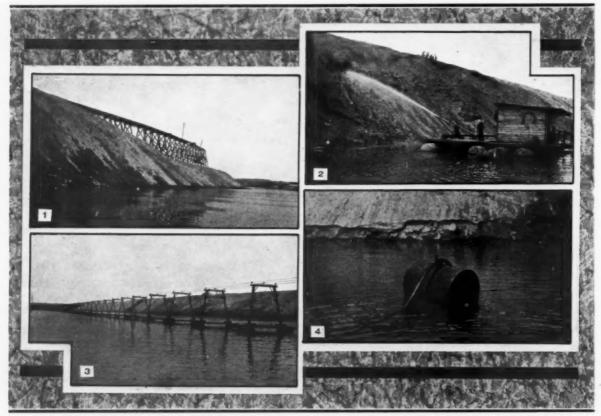


A Transformer on the Floating Transmission Line Supplying Current to the Monitors

Eight shovels are used in these borrow pits as follows: in the southeast pit one Bucyrus-Erie 103, in the southwest pit one Marion 76 and two Marion 37's, in the northeast pit one Bucyrus-Erie 103 and in the northwest pit one Marion 61 and a Marion 32. A Marion 450 gas-electric shovel was used to grade the new location for tracks and also helped in the several borrow pits. The material was hauled from the borrow pits in Western 12-yard dump cars pulled by Porter, American and Baldwin locomotives. There were thirteen of these trains with an average of 12 cars each. Fourteen miles of standard gage track were used on the job from the borrow pits to the trestles from which the material was

ing an impervious core wall. The pool was kept about 20 feet deep which gave the proper gradation of the material. The deeper the pool the finer was the material in the center. With the pool at 20 feet as high as 98 per cent of the material in the center would pass a 100 mesh sieve. The specifications required 65 per cent and this requirement was always exceeded.

The biggest month for the placing of dirt in the dam according to the measurements made by the engineers for the owners by cross-sectioning the dam was 701,364 cubic yards of pay dirt in place. This was done with seven shovels working in five locations and loading to the 12-yard cars.



VIEW IN THE MILE-LONG SEGREGATION POOL, SHOWING METHODS OF DUMPING AND SLUICING MATERIAL FOR THE SALUDA DAM

1. A section of one of the trestles from which selected earth was dumped from 12-yard standard gage railroad dump cars. 2. One of the five monitors sluicing material from the dike formed by dumping. 3. The transmission line supplying the monitors. 4. Method of carrying electric cable in water hose from transmission line to monitors.

dumped preliminary to washing into the central pool by hydraulic giants, and for the handling of other materials.

The trestles were built in 25-foot lifts and all material was hauled down grade. This necessitated careful planning on the part of the engineers for Arundel so that the earth could be taken from the proper elevations at all times and not create a serious problem of hauling at the end of the work when the earth was placed at elevations over 200 feet above the base. The material was dumped from the trestles and then sluiced to place in the large central pool. This method gave a remarkable grading of the earth in the dam inasmuch as the finer material was worked toward the center giv-

THE MONITORS

For sluicing the material into place from the dumps five floating monitors were used. These were mounted on platforms carried by steel tank floats and operated by electric power. The electric power lines were carried down the center of the pool on towers floated on oil drum pontoons. The pumps were driven by 3-phase, 2,300-volt motors. The lines to the separate pumps from the main line were carried through water hose and floated on oil drums. The pumps were Allis-Chalmers 750-gallon per minute centrifugals operating at 130 pounds pressure. The tips of the nozzles were $1\frac{1}{2}$ inches in diameter.



A View of the Sluicing Operations in March, 1929, Showing the Great Segregation Pool Created to Grade the Core of the Dam

Floating roots, chips and grass which get into the pool and which would form weak strata in the core were removed in a novel manner. The wind blew the floating dross down to one end of the pool which is about a mile long. A water hose plugged at both ends to make it float was used as a floating seine to pull the material to the shore where it was raked out into piles to dry and to be burned.

This gigantic pool has been raised from the level of the stream bed to the top level of the dam by gradual stages. As one of the engineers stated it, the pool is the largest that has ever been raised bodily to such a great height.

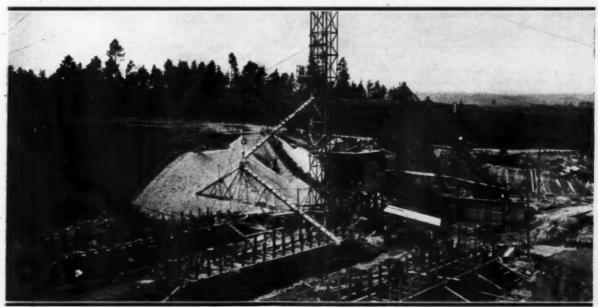
THE SPILLWAY

The spillway will require about 15,000 to 18,000 yards of concrete to construct the necessary foundations and supports for the massive gates, and the bridge

which will carry the state highway over the structure. In the excavation for the spillway a quarry was opened which furnished sufficient stone for the rip-rap for the upstream face of the dam from elevation 300 low water to elevation 367.

The concreting plant for the spillway was simple in construction and very effective. Trucks delivered the aggregates at the brow of the hill above the spillway and dumped for side hill storage. A derrick with a ¾-yard Williams bucket picked up the aggregates and placed them in the Blaw-Knox bins which were equipped with a batcher and inundator. An Orr & Sembower with a Westinghouse motor was used to operate the stiff-leg derrick. The mixing plant consisted of a Ransome mixer driven by electricity.

The cement was delivered to a storage shed having a capacity of about 3 cars. From the shed the bags were



Stockpiles and Concreting Plant at the Spillway

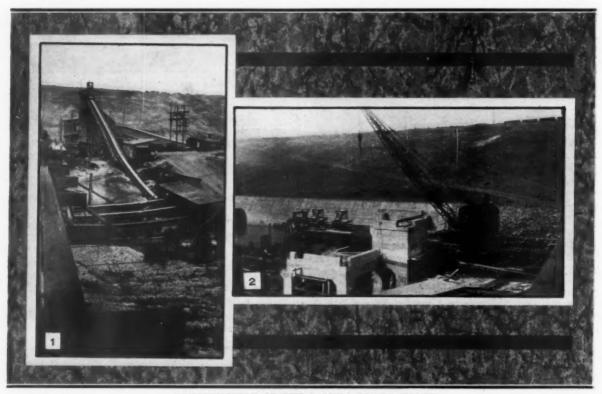
delivered to the mixer platform by a Barber-Greene conveyor. The cement was emptied into a novel wooden box composed of three sides and a bottom with a hinge at the end opposite the open side. The open side was closed when the box was in position for filling by a baffle fixed to the frame above the box. When the cement was dumped the box was tripped and the cement flowed out from under the baffle.

The concrete was dumped from the mixer into the bucket of a 165-foot Insley tower and hoisted to the 200-foot chuting system. A Barnes pump was used to keep the excavation dry for the placing of the forms and the concrete.

A Bay City locomotive crane was used to handle the

tubes were so built in the carpenter shop on the hill that they could be collapsed after the concrete had set and be used over again in the next tube to be poured. This made a considerable saving in the form work and the lumber as the tubes were of such large dimensions. Instead of the usual soap to fill the cracks in the forms the superintendent used Brixment, which made a tighter job and was firmer than the usual soft soap. The largest pour made around a draft tube at one time amounted to 700 cubic yards of concrete.

The labor organization for the form work consisted of 15 men in the reinforcing gang and 40 carpenters, which included the men in the platform gang as well as the men in the pit assembling the sections. The re-



CONSTRUCTION OF THE SALUDA POWER HOUSE

1. View from the unloading trestle, showing the three belts for handling aggregate, the long conveyor to the storage bins and the enclosed central mixing plant. 2. Locomotive crane which handled forms, steel and equipment at the power house, and the hopper cars which delivered concrete from the central mixing plant to chutes above the forms.

stone in the quarry and a Northwest dragline crane for the handling of the excavation forms and steel in the concreting of the spillway. About 40 men were used in the work on the spillway, including the concreting.

CONSTRUCTION OF THE POWER PLANT

For the construction of the power plant superstructure and foundations considerable preparation of the ground was necessary. The foundations for the huge power units were built in caissons measuring 15 feet 7½ inches wide and 11 feet 6 inches high. The caissons were made of Carnegie and Lackawanna steel sheet piling of 12¾ and 14-inch web driven 22 feet with a McKiernan-Terry steam hammer. The caissons were unwatered with a Pennsylvania Pump Co. 8-inch centrifugal. The forms which were used for the draft

mainder of the 80 men making up this crew were mechanics.

An Industrial locomotive crane capable of handling 60,000 pounds at a 15-foot radius was used for the handling of forms, sheet piling and all miscellaneous work on the power house.

THE MACHINE SHOP

For a job the size of the Saluda Dam and power house a fully equipped machine shop is not only a money saver but an absolute necessity. The equipment in the machine shop consisted first of a complete welding and cutting outfit. The mechanics and the superintendent agreed that it was the most important part of the equipment. Davis-Bournonville and Air Reduction Sales Corp. equipment was used. The machines in the shop

included: a Curtis pipe threading machine; a Black & Decker heavy duty electric grinder; an Economy 2-speed power hack saw; a Morris Machine Tool Co. drill press; a Greenfield Tap & Die Co. bolt threading machine and an American Tool Works lathe. The shop was run by a group of four machinists.

COMPRESSED AIR PLANT

The compressed air plant which furnished power for all the pneumatic equipment from the beginning to the end of the job consisted of a Pennsylvania compressor, 12 x 7½, operated by an Allis-Chalmers motor and furnishing air at 125 pounds pressure for the concrete finishers, rock drills and other equipment.

THE TOOL SHOP

The tool shop was equipped with a forge with a power blower and an Ingersoll-Rand pneumatic drill sharpener and was a very busy place during a large part of the time when the foundation for the dam was being prepared and the work under way for the foundation for the power house.

THE CARPENTER SHOP

The carpenter shop was a large shed with one end open to a large open air platform where work would be carried on in good weather. The shop was equipped with a Crescent band saw, an American Saw Mill rip saw, a jointer and a cut-off saw of the same make. A saw filing room was attached where the circular and hand saws were kept in perfect trim.

All lumber for the job including the form lumber for the spillway and the power house was from timber cut in the clearing of the site of the dam and lake. It amounted to several million board feet.

CONCRETE PLANT FOR THE POWERHOUSE

Crushed stone from local quarries in Columbia was delivered by rail to a trestle over huge bins and The aggregate in three sizes was redumped. moved by one belt for sand and two for stone from pits below the bins and delivered to a single 300-foot belt conveyor with a gate at the top which distributed the aggregate to the proper section of the Blaw-Knox bins over the two Ransome 1-yard mixers. The batches were made up in the proportions of 1:2:4 for the power house and 1:21/2:5 for the spillway. The bins had a capacity of 500 yards of stone and 250 yards of sand. The concrete was delivered from the mixers to the forms by steel hoppers with side-dump chutes mounted on industrial railway cars and hauled by gasoline locomotives.

The cement was received by rail and delivered in the (Continued on page 128)

A Well-Planned Plant on a 180-Acre Sand and Gravel Deposit

The Van Camp Sand & Gravel Co., South Lebanon, Ohio Has Modern \$400,000 Installation With Many Novel Features



ONTRACTORS in Southern Ohio have another new modern plant to look after their needs in sand, gravel and crushed stone in the recently completed washery of the Van Camp Sand & Gravel Co., near South Lebanon, Ohio. At a cost of nearly \$400,000, this new plant is one of the

best designed and equipped in the Ohio Valley. It is located on the main line of the Pennsylvania Railroad as well as the Little Miami River about 3 miles from Morrow, which is 23 miles from Cincinnati.

WORKING THE DEPOSIT

The deposit consisting of 180 acres extends to a known depth of 60 feet of well-graded material of high quality. The deposit is being worked down to the water line against a bank with a 25-foot face. A 2-yard Marion steam shovel is being used for excavation and 20-yard two-way Koppel air-dump cars drawn by a steam dinkey discharge the material into a concrete hopper or pit which has a capacity of 100 tons. The material is fed from this hopper to a 36-inch belt conveyor by two 30-inch Telsmith reciprocating Timken-

bearing feeders. The first 36-inch conveyor is 160 feet long, operating at an angle of 17 degrees, carrying the material to a separating grizzly. The over-size passes over the grizzly into a 13-A Telsmith primary breaker. The crushed material is then united and is delivered onto a 36-inch belt conveyor 300 feet long.

Operating on a 19-degree slope the 300-foot belt conveyor delivers the material to the top of the plant at a height of about 100 feet. The material is then screened by a 72-inch x 25-foot scalping screen having perforations 21/4 inches in diameter. The material passing through the scalping screen goes direct to a 60-inch x 25-foot gravel screen. The oversize on all material, plus 2 inches, passes out the end of the scalping screen and goes to a No. 52 reduction crusher. The oversize material from the gravel screen, when it is not desired to use 2-inch stone in any product, is sent to a 3-foot Symons cone crusher. The product from both crushers is deposited on a 30-inch belt conveyor which carries the crushed material to a 60-inch by 24-foot doublejacketed stone screen with arrangements for returning the oversize from the stone screen back to the Symons crusher for further reduction.

The sand, water and silt from the gravel screen is flumed to two Jeffrey 42-inch sand drags, each having a capacity of 50 tons of sand per hour. The overflow



The 100-Ton Hopper into Which Material Is First Lumped and Then Fed to Belt Carrying It to the Separating Grizzly

from the sand drags is delivered to three No. 8 fine sand tanks which recover the fine brick sand. The wash water is then delivered to a 600-foot flume running to a settling basin.

The outer jacket of the stone screen is made of ¼-inch round perforations through which the water and fine screenings are flumed to a No. 7 Telsmith converging tank which extracts the clean ¼-inch dust stone screenings and allows the waste water to overflow into the waste water flume.

STORAGE TANKS

The storage tanks or silos are arranged four on one side and five on the opposite side of a 10-foot truck driveway with the loading tracks on each side and facilities for truck loading in the center.

The concrete silos are 20 feet inside diameter, 50 feet in height and are made of heavily reinforced concrete, each having a capacity of 750 tons each. The entire structure, including the conveyor and machinery supports, as well as the building, are of fabricated steel.

PUMPING EQUIPMENT

Water is supplied by two 10 x 10-inch Weinman roller-



View of the Primary Crusher House and Main Conveyor

bearing centrifugal pumps, each direct connected to a General Electric 125-horsepower motor. Water is delivered through a 400-foot 14-inch pipe line to the plant proper at the rate of 3,000 gallons per minute. One pump only is operated at a time, the other being used as a spare.

TRACKAGE

There are nearly two miles of private side track and switches on the property. Cars are drifted onto the loading positions and then released onto the railroad truck scales owned by the Van Camp Co. The cars are then set on the storage tracks ready for delivery to the railroad company. Arrangements are provided for a ground storage of approximately 20,000 cubic yards.

OPERATION

Johnson batchers have been installed for the correct



Screening Plant and Storage Silos before Completion of Roof and Grading

measurement of truck loads, while truck scales are also used for weighing out material.

This plant has shown an exceptionally high degree of efficiency in operation, as the first day it was placed in operation, it produced 20 per cent over its rated capacity of 3,000 tons. Actual construction was started on the concrete work on March 1, 1929, and the steel work April 10. The plant was operated for the first time on July 23, 1929.

PERSONNEL

Although B. T. Van Camp, President of the Van Camp Sand & Gravel Co., is mainly responsible for the existence of this modern sand and gravel plant, he has given great credit to C. G. Milburn of the Milburn Machinery Co., of Columbus, Ohio, designers of the plant and which had the general contract for all the machinery steel work, electric motors, wiring and pumping.

Dredging

Builds 900-Acre Airport

and Hydroplane Basin

New York Air Terminals, Inc.,

Creates New Large Airport



First Drainage Ditch Along the Edge of Site Excavated with Crawler Dragline. Wet Clay and Silt Later Filled This Ditch Making It Practically Useless

on North Jersey Marshes Overcoming Unfavorable Soil

and Drainage Conditions by Well-Conceived Methods



ERSEY hawks and the "Mosquito Parade" were about all the New Jersey marshes were known for until the Western Electric Co., built its huge manufacturing plant at Kearny. Now another bid for fame is being made by the Jersey marshes in the form of a huge airport under construc-

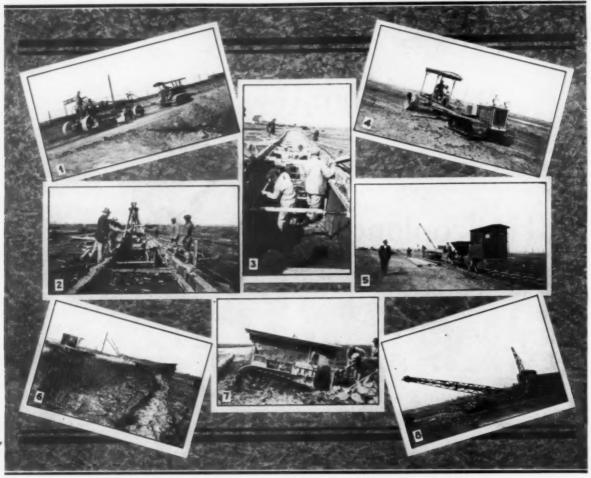
tion within 10 minutes of the Holland Tunnel leading to New York City.

Taking a 1,000-acre tract, three-quarters of which lies north of the Erie Railroad main line and one-quarter to the south between the Erie and the Delaware, Lackawanna & Western Railroad, a vast grading and drainage operation was started. Two small areas of high ground were attacked by steam shovels and the material used to build a road around the entire area and to construct two crossroads. These roads facilitated the handling of equipment and also acted as dikes for the dredging operations. The average elevation of the field before fill began was 5 feet above mean low water.

DREDGING

The contract for dredging was awarded to the Standard Dredging Co., and work started April 15, 1929. The contract called for the delivery of 375,000 cubic yards of material per month from an area along the shore of the Hackensack River to fill low spots in the field. A dragline put up a dike 9,000 feet long and 4 feet high along the river and the Erie Railroad before dredging operations were started. With a bonus in view, the dredging contractor placed the 26-inch turbine-electric dredge Miami and the 20-inch steam dredge Mohawk on the job with the result that over 1,000,000 cubic yards per month has been delivered and dredging operations which it had been expected would continue until June, 1930, will be completed in January,

The Mohawk digs only to a depth of 39 feet, so the Miami was used to clean up to a depth of 45 feet. These two pieces of equipment created a 90-acre basin for hydroplanes as will be seen in the airplane view. The hydroplane basin which was originally intended to be 76 acres in area was enlarged to 90 acres. The completed basin has a maximum length of 3,600 feet for



GRADING AT THE NEW YORK AIR TERMINALS AIRPORT AT SECAUCUS, N. J.

1. Russell 12-foot blade grader and Caterpillar Thirty maintaining one of the marginal roads. 2. Williams 34-yard clamshell excavating one of the drainage trenches between the wood sheeting. 3. Hand mucking the sides of the trench. 4. A Cletrac 30 Swamp Special with 20-inch treads hauling a Shawnee grader with 24-inch wheels and a special 12-foot blade. 5. Whitcomb gasoline locomotive and Easton industrial equipment. 6. The 4-foot dike put up before dredging began. 7. A Caterpillar Thirty temporarily out of commission. 8. The Bucyrus-Erie in an unusual pose.

take-off and a distance across of about 1,850 feet with an average 45-foot depth at mean low water.



An Effective Dirt-Moving Unit Used on Short Hauls in Cutting High Spots and on Road Grading. A Miami Trailer Scraper and McCormick-Deering Tractor

The dredge Miami has a steam turbine and electric drive. The Elliott 2,000-horsepower turbine drives the main pump through a reduction gear and also drives a 500-kva Electric Machinery Co. generator at 300 rpm on the low speed shaft. This generator is a 60-cycle, 440-volt, 3-phase A.C. machine. An auxiliary Elliott turbine drives a 375-kva, 440-volt, 60-cycle, 3-phase generator in parallel with the first generator. These two supply all power for the service pumps, oil and water transfer, boiler and bilge pumps, as well as the 500-horsepower cutter motor and the 75-horsepower winder motor. The voltage is controlled by a Westinghouse regulator.

A crew of 48 men operate the dredge while 42 men are used on the pipe line and fill. The Miami has a 29-inch suction and a 26-inch discharge. Lancaster Iron Works pipe capable of carrying 95-pound pressure and made of electric welded steel is used.

Steam for the dredge is supplied by three Foster water tube boilers with 3,000 square feet of heating surface each, using Ray mechanical oil burners. The dredge is operated 24 hours daily and night work is made possible on the pipe line by Milburn carbic lights.

The pontoon cylinders used between the dredge and the land line measure 54 inches by 20 feet each and were made for the Standard Dredging Co., by R. S. Newbold, Norristown, Pa.

The Mohawk which is a 20-inch dredge is equipped with two Foster boilers having Ray burners and a triple expansion engine built by the Craig Engineering Works, Long Beach, Calif. A 250-horsepower turbine made by the Moore Turbine Works, Wellsville, N. Y., drives the cutter. The Miami has a 24-inch suction and a 20-inch discharge and operates with a crew of 35 men on the dredge and 50 men on the pipe line. The maximum length of pipe through which the dredges have discharged on this job are 7,200 feet for the Miami and 4,500 feet for the Mohawk.

The dredging contract was for 6,000,000 cubic yards to be delivered in 16 months and the job will be completed in less than 9 months. Dredging operations started April 15, 1929.

LAND GRADING

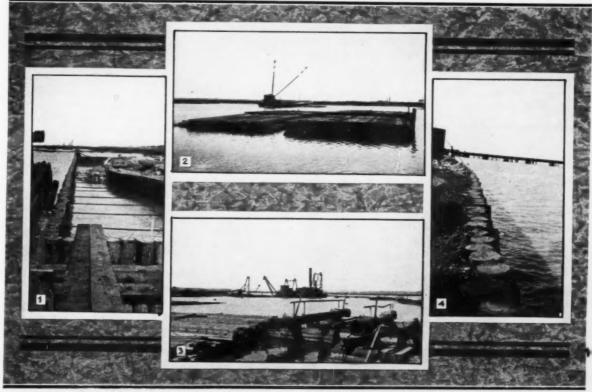
The field is being graded to 14 feet above mean low water at the center of the field and 8 feet at the river. The average grade is 1 foot in 600.

The New York Air Terminals, Inc., is handling its own grading using one Thew Lorain 1¼-yard gas shovel, one Osgood 1-yard gas shovel, and one Erie crane convertible to a steam shovel. A P. & H. crane was used on the dikes. Where shale was encountered at the higher sections of the grading a portable compressor was used in the shale.



Driving Wood Sheet Piling Along Drainage Trench Before Excavation by Clamshell

Additional equipment employed included one Russell Super-Special grader with 12-foot blade, one Shawnee grader with Cletrac power, one Miami power scraper, a Caterpillar Sixty tractor and a Caterpillar Thirty tractor, one McCormick-Deering tractor, a Monarch 50



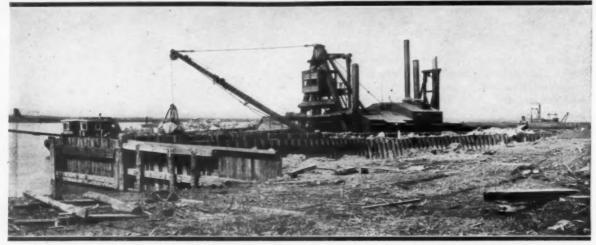
DOCK, LUMBER UNLOADING AND DREDGING AT THE NEW SECAUCUS, N. 1., AIRPORT

1. The first line of steel sheet piling at the dock out of line after backfilling and the new line of close piles before backfilling.

2. Unloading lumber and rafts of lumber in foreground.

3. The dredge Miami at work.

4. The close piling after backfilling.



Filling Back of Steel Sheet Piling and Close Piling at Dock. Dredge Miami Working at Extreme Right

with bulldozer and one Linn tractor truck. All this equipment is provided with the widest wheel and crawler treads available from stock.

All of the hauling has been handled on a per diem basis with the individual owners of trucks, all of the trucks being equipped with dual pneumatic tires. Grading started June 27, 1929, with the cleaning out of muck holes by the crane which operated on mats. The Erie crane was mired for one whole week in a particularly bad hole.

DRAINAGE

The first drainage trench was dug along the edge of the property using the dragline, but it soon filled up with the soft silt and wet clay and was redug. The method of digging the drainage trenches along the runways was to drive wooden sheeting 10 feet long on either side of the ditch and then excavate the muck from between the sheeting by means of a clamshell. A total of 120,000 feet board measure of lumber was used on

The Dredge Mohawk Working on the Hydroplane Basin and Delivering Material for Filling Low Spots on Field

2,000 feet of trench. Considerable experimentation was necessary to find the best method of handling this excavation. The use of lumber ran as high as 90,000 feet bm per month when operations were stabilized and speeded up. It was found necessary to tie the tops of the trench sheeting together to prevent the bottoms from pushing in.

An Ingersoll-Rand portable compressor was used for driving the 2 x 8-inch x 10-foot wood sheet piling for the open ditches and 4 x 4 rough timber was used for bracing and walers.

Operations were closed down about November 15 because of weather conditions. Drainage operations in the spring will probably involve the use of drain tiles and porous fill above the tile.

Industrial Railway Very Effective in Wet Weather

A line of industrial railway using Easton cars and Whitcomb gasoline locomotives was installed and proved its value at once when a rainy spell put the trucks out of commission. At the start the single line of railway was used to haul lumber to the trenches and to haul dirt to fill at the dock. Where the industrial railway paralleled the trench the crane worked against the trench digging as it went and casting the muck to the far side of the trench. Trucks with stable material dumped immediately behind the crane which turned, picked up the material and loaded it into the industrial railway cars for haulage to the dock where it was spread with a McCormick-Deering tractor and bulldozer.

DOCK CONSTRUCTION

To make it possible to handle supplies coming by river, a dock was built on the shores of the Hackensack near the Erie main line tracks. This was built with Larssen No. 2 steel sheet piling driven by a McKiernan-Terry No. 7 steam hammer, but it moved toward the river when fill was placed behind it. The lateral movement made it necessary to remove the fill and to put in a close pile bulkhead about 25 feet from the steel sheet piling on the river side. When this was backfilled with rock, it moved a maximum of 4 feet at the center and about 1½ inches at the end, because of the large amount of muck. A crack could be

seen in the fill about 25 feet back of the sheet piling where the anchor piles were driven.

CENTRAL MIXING PLANT

A stiff leg derrick was erected on the dock to handle stone and sand from barges in the river, loading to a Blaw-Knox bin and batcher which delivered to the Ransome mixer. The industrial railway equipment will be used to carry the concrete to the paving operations for the runways and hangar aprons.

RUNWAYS

Six runways each 3,500 feet long are to be built eventually at this airport. The runways will be a slag and cinder base using the 100,000 yards of slag on the south section of the property left there by an old iron

perintendent, with J. W. Adams as Resident Engineer, and Capt. J. S. Kenny in charge of ditching and river work and D. S. McGrath in charge of land work. For the Standard Dredging Co., Capt. Roy F. Heller was in charge.

Rock for Dam Dislodged by Huge Blast

TREMENDOUS blast which shook the countryside for miles around was used to dislodge a solid granite mass of rock 750 feet long, 45 feet thick and 160 feet deep, during the preparation for the construction of a dam on the Mokelumne River about 50 miles east of Jackson, Amador County, California. To effect the explosion 41 holes each 6 inches in diameter and 160 feet deep were drilled 21 feet apart and 11/2 tons of dynamite packed into each one.

The dam, which is a project of the Pacific Gas & Electric



AIRPLANE VIEW OF SECAUCUS AIRPORT TAKEN SEPTEMBER 1, 1929 Dredging for hydroplane basin in foreground, industrial site at right between two railroads

works. As soon as the slag has stabilized the clay surfacing will be laid. Two of the runways are to be completed by mid-summer, 1930, owing to the speed with which the dredging operations progressed.

LUMBER HANDLING

In addition to a large stock of lumber maintained at the dock, consisting of 10 x 12 and 5 x 12 timber, loads were brought into the hydroplane lagoon, unloaded and rafted in. At the dock 10 x 12 lumber was used as a roadway to make it possible for the trucks to handle heavy loads.

PERSONNEL

The Secaucus Airport is being built for New York Air Terminals, Inc., of which W. F. Carey is President and B. H. Wait is Chief Engineer. The construction operations are in charge of Theodore Pyle, General SuCo., will be the largest rock filled structure in the world, it has been announced. It will be 360 feet high, 1,320 feet long at the top, 960 feet thick at the base and will contain more than 3,000,000 cubic yards of rock.

Highway Location and Surveying IGHWAY Location and Surveying," by W. W. Crosby and George E. Goodwin, has recently been published by the Gillette Publishing Co., Chicago, Ill. The volume is divided into three parts. Book I is intended to stimulate the imagination needed by successful location and is a discussion of the general subject of highways. Book II shows the highlights of the general subject in mountainous territories as well as furnishing practical information on the subject. The third Book is a compilation of practice which, with the Appendices containing the forms in actual use in one or more of the largest (in highway expenditures) states, shows the ways and means for translating theories into results. The price is \$5.00.

Speed Marked Construction of Florida Lime Rock Base Road



HE secret of the extensive hard road system in Florida is the use of the lime rock which is so abundant throughout the state. This rock, which to the uninitiated appears to be of little use as a road material, has properties that make it unusually valuable for the construction of

base courses. The rock is mined by the open pit method, crushed and hauled to the work, being laid wet, which is the secret of its success. The wetting and rolling compact the material in such a way that it becomes a mass as hard as macadam and even more difficult to scarify after it has carried traffic for some time.

The Broadbent Construction Co., was awarded the contract for the construction of State Aid Project 518, Road 5A, running from Branford to Mayo, Fla., a distance of 17.76 miles. To speed the work a construction outfit was started at each end. On the Branford end lime rock was supplied from a small quarry opened for this work about 3 miles from the end of the job and also rock was brought in by rail from Haile, Fla. The imported rock was unloaded from the cars to the fleet of trucks by a Byers Bear Cat with a ½-yard Owen bucket.

THE LIME ROCK QUARRY

Lime rock quarries in Florida, which are worked by the open pit method, use faces from 10 feet to 90 feet high. The Ocala Lime Rock Co., which handled the mining operations for this work, has a mine in Ocala where the face is 85 feet high and the rock is solid without mud pockets or seams. At the Branford mine the face was only 20 feet high. The river near the mine limited the depth of operations because of the ground water.

The rock is cohesive enough in its natural state to be difficult to handle with a steam shovel without shooting it down. For this 30 per cent glycerine Peerless dynamite was used at Branford.

An Erie 4/2-yard steam shovel loaded the shattered rock into two skips which ran on rails across the mine to the face being worked. The skips were hauled up a long incline to the hopper into which they were dumped automatically by an inclined rail which raised the rear of the body and tipped it so that the swinging door at the front opened and discharged the load. From the dumping hopper the rock went through crusher rolls and into the loading hopper from which its discharge

Broadbent Construction Co.

of Ocala, Fla.

Laid 1,000 Feet of 20-Foot

Highway

8 Inches Thick Each Day

was controlled by a hand-operated gate for filling the trucks to the proper level.

A Bessemer 60-horsepower oil engine operating 225 rpm furnished power for the operation of the roll crusher and the friction hoists for the skips.

GRADING AND PREPARING THE BASE

The rough grading for the lime rock base was done with a Galion E-Z grader with a 10-foot blade hauled by a Caterpillar Thirty tractor. The grade was rolled ahead of the laying of the base after wetting with either a Galion or a Huber 10-ton roller. These same rollers were used to compact the lime rock as laid on the grade and for scarifying in the process of finishing the base course.

After the blading operations on the grade a template was used to see that the grade was finished to true cross-section. A crew of 7 men then hand finished the grade and also set the wooden forms made of 2 x 8-inch plank with "heels" 3 inches high. These forms were well staked to hold them in place. The additional 3-inch heel gave the proper depth for the lime rock to be spread. The rock was dumped on the grade and then spread by 4 men using hoe rakes similar to those used by clam diggers except with longer handles. The 11-inch depth of the rock was then compacted to 8 inches by the rollers while the rock was well wet down from a hose. Water for this wetting was supplied by a Barnes Triplex road pump on the bank of a creek near Branford pumping through a 2-inch pipe. Taps for the hose were installed at intervals of about 200 feet. The specifications required that the pump deliver 60 gallons per minute at the hose nozzle.

The forms were set 20 feet apart and the grade and

rock base both given a 2½-inch crown. Five-foot shoulders were made by hand on either side of the road. When the first rolling of the base was complete the forms were pulled and the edges of the base rerolled until they were as firm as the remainder of the base course.

The shoulders were dressed by hand, only the roughing being done by blading. This is necessary because of the rigid specifications in Florida for the shoulders because of the ease with which the rains erode the shoulders and undercut the pavement, causing its failure.

After the road had been completed as far as the first compacting with the roller and had been used by the trucks for a few days it was scarified to a depth of 4 inches and bladed to the $2\frac{1}{2}$ -inch crown again until it fitted the template perfectly. It was then rolled with the 10-ton rollers again until it would not compact further.

THE HAULING FLEET

The fleet of trucks used to haul the lime rock from the railroad siding and from the mine was composed of 14 Autocars, 7 Ruggles, 4 Hugs and 3 Internationals. Another fleet was used at the other end of the job where all the rock was brought in by rail from Williston, Fla. Thirteen miles of the pavement was handled from the Branford end, giving an average haul of 6.5 miles with a dead haul of 3½ miles for the trucks hauling from

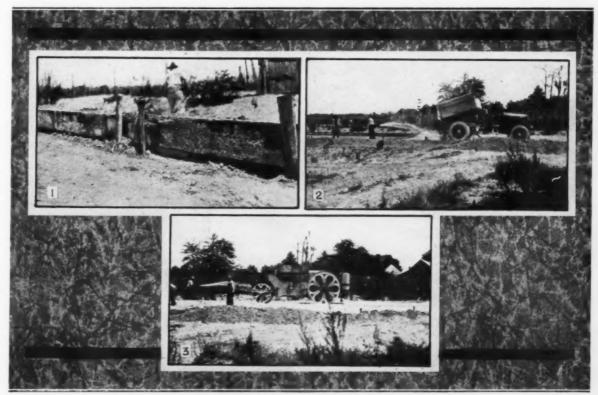
the mine. The Ruggles trucks could handle only 3 yards of rock while the other trucks handled 4 yards at a load.

The trucks with the lime rock were turned on a Blaw-Knox turntable and backed over the rock base already laid to the end of the work to dump their loads.

All of the trucks were equipped with hydraulic hoists for the dump bodies. These were used in a clever manner when the trucks were mired in the sand on the shoulders which happened with quite a high frequency. To get out of the sand the trucks would raise the body with the load in and place a post, fence rail or whatever was handy under the body and then lower it. This would lift the rear wheels out of the sand and permit filling in with better material or planking so that little time was lost in this manner.

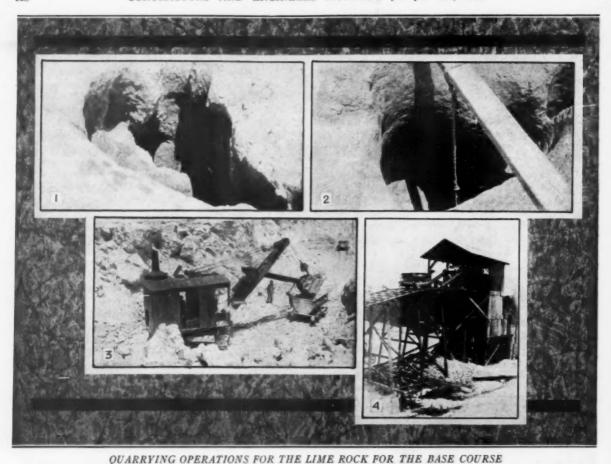
SURFACING

The principle of the Paint Up and Clean Up Campaign Committee work "Save the Surface and You Save All" is the principle of the Florida lime rock road. The lime rock furnishes an almost perfect riding surface, but without protection it would erode in the heavy rains. To save the surface a thin coat of asphalt is applied and covered with granulated slag. First a coal tar prime is applied hot at the rate of 0.2 gallon per square yard after which the entire surface is covered with very thin coat of sand to take up excess oil not absorbed by the base. Traffic is then allowed to use the



PLACING THE LIME ROCK IN THE ROAD

1. The 8-inch wood forms for the lime rock base with 3-inch "heels" to give a measure for the 11-inch depth to which the rock was spread for rolling to 8 inches. 2. Dumping a load of rock and wetting down. The wetting is an important part of the process of laying one of these lime rock roads as it permits greater compaction of the rock and aids in the hardening of the road until it is difficult even to scarify it. 3. Rolling the lime rock. This is accompanied by further watering. This Huber roller was also used for scarifying the top 4 inches of the surface for final grading before the asphalt treatment.



1. A typical mud pocket which had to be cleaned out before the shovel could load the lime rock. 2. A smaller pothole cleaned out by a man lowered into the opening and the mud hoisted out a bucket at a time. The men are paid by the cubic foot of mud removed. 3. Erie steam shovel loading one of the two skip cars in the quarry. 4. The top of the skip ramp where the cars dumped into the crusher hopper and below which the trucks were loaded.

road until the oil has worked in thoroughly. Next the road is swept thoroughly with power sweepers or rotary brooms pulled by trucks, sometimes several trips being necessary to completely remove all dust. Following this 0.5 gallon per square yard of asphalt as a seal coat is applied and immediately covered with 50 pounds per square yard of No. 4 special slag hand-cast and then rolled with tandem roller.

PERSONNEL

The Broadbent Construction Co., Ocala, Fla., was the contractor for this job. Carl Rose is President and F. M. McGowen was Superintendent on this work. G. A. Smith was Job Foreman at the Branford end of the work and T. W. Barnett was Superintendent at the lime rock mine. For the Florida State Road Department, H. D. Duke was Project Engineer and J. M. Bailey, Inspector.

Construction Features of Dam

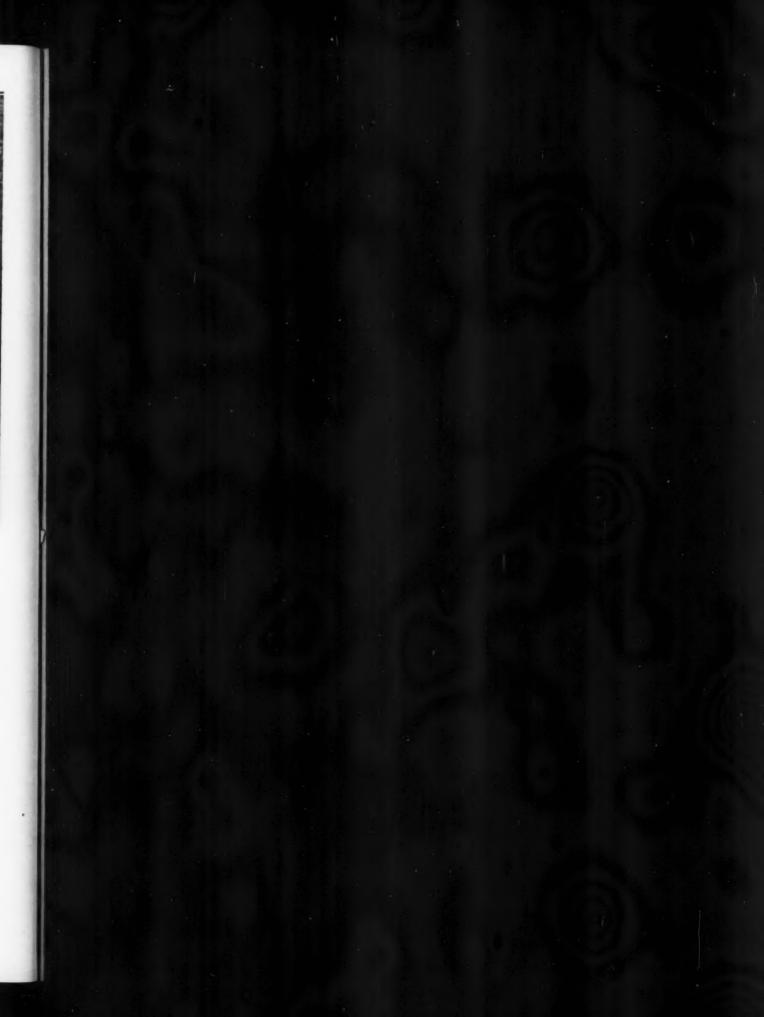
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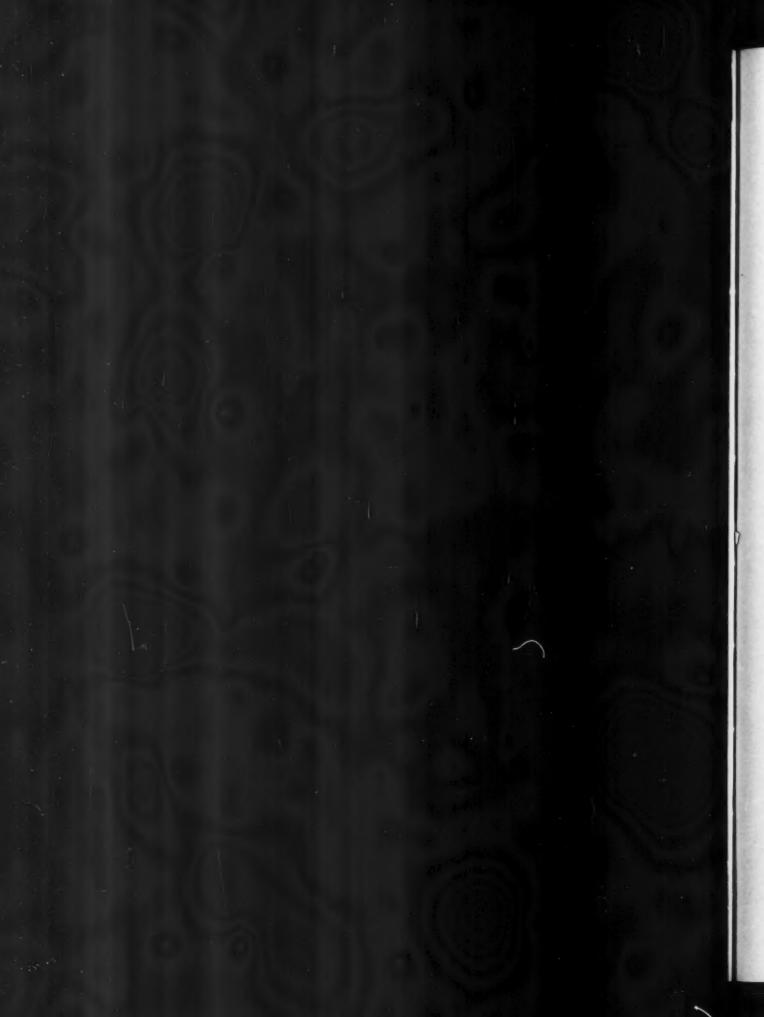
cars to a cement house on a spur track near the concrete plant. The house had a capacity of 30 cars of cement. Two men were used to load the cement bags onto a 200-foot conveyor running all the way through the cement house and up to the mixer platform. Three

men were used to handle the cement at the mixer, 2 men at each mixer, one to handle the batcher and the other the mixer, one man at the top of the aggregate belt to divert the material to the proper bins and one man on the feeder belts at the aggregate delivery bins and one laborer in the cars being unloaded. Aggregate for the spillway was delivered to the same trestle but dumped on the opposite side from the belts and loaded into two White trucks which hauled 12 hours daily the $2\frac{1}{2}$ miles to the spillway side hill storage pits.

PERSONNEL

The general contractors for the construction of the Saluda Dam and power house are W. S. Barstow & Co., Inc., New York, who received the contract for the entire project for \$22,000,000. The general contractor awarded the construction of the dam by subcontract to the Arundel Corp., Baltimore, Md. The engineers for the project are Murray & Flood, New York, for whom Arthur L. Wellwood is Resident Engineer. A. S. Crane, New York, is Consulting Engineer for the entire project. N. D. Urquhart is Construction Engineer for Barstow, with McQueen Quattlebaum as Assistant Engineer and A. Bostain as Superintendent in charge of the construction of the power plant. A. C. Bruce is Engineer for the Arundel Corp., with H. O. Firor as General Superintendent.





A Section of
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Civil Engineering Field

The Consulting Engineer

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Water Supply Projects in Florida, Maryland and West Virginia

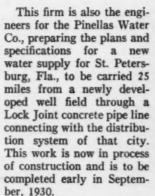
Activities of Malcolm Pirnie's Office

N June, 1929, MALCOLM PIRNIE opened an office at 25 West 43rd St., New York, with Charles F. Ruff as his Chief Assistant. Mr. Ruff has been assisting Mr. Pirnie in most of the work in which he has been interested since the War and has been largely responsible for the successful execution of the work.

Early in July, 1929, Clifton W. Bolieau was added to the staff, and in September Ranald V. Giles, formerly resident engineer for part of the construction program at West Palm Beach, joined the staff in the New York office. About the middle of October a branch office was opened in St. Petersburg, Fla., with C. A. Barnett as Resident Engineer and Alex. O. Taylor as assistant to Mr. Barnett. Both of these men are residents of Florida and have assisted Mr. Pirnie on work of considerable magnitude in Florida during the past few years. They now have working with them fourteen men making up the survey parties necessary to describe rights of way and to secure the location of a long pipe line.

The first task of the New York office was to prepare the plans and specifications for a 12 m. g. d. filter plant for a paper mill of the West Virginia Pulp & Paper Co., at Luke, Md. The design of this plant was based upon an investigation and report to determine the best means of treating the type of water found in the upper Potomac River. The filter plant is being

constructed by the Morton C. Tuttle Co., of Boston. The project is particularly interesting in view of the fact that the construction company was authorized to proceed with the work on the same day that the engineers were authorized to proceed with the design. The engineers have won the race by completing the plans and specifications before the construction company has completed the filter plant.



Since opening the new of-

\$189,746.

since opening the new office, Mr. Pirnie has received the final decree in the Federal Court of Florida in the case of West Palm Beach Water Co. vs. The City of West Palm Beach. Mr. Pirnie acted as expert witness with George W. Fuller for the West Palm Beach Water Co. in this litigation, and was very much gratified by the final decree in the Federal Court.

In the St. Petersburg work, the firm is supervising Construction for the Pinellas Water Co., and the J. B. McCrary Co., of Atlanta, Ga., are the general contractors for all of the work other than the long supply main. The contract for the supply main has been let to the Lock Joint Pipe Co., for the installation of steel cylinder encased concrete pipe, 36 inches in diameter.



Malcolm Pirnie



Charles F. Ruff

Paving and Lighting in River Forest, Ill.

PLANS and supervision of construction for an electric street lighting system for the Village of River Forest, Ill., at an estimated cost of \$433,645, are now under way by L. L. HARPER & Son, consulting engineers, River Forest State Bank Bldg., River Forest, Ill. This organization is also working at this time on reports and plans on a paving project for River Forest which will comprise 27,900 square yards of reinforced concrete pavement at an estimated cost of

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Water Works and Sewage Treatment Plans

HE firm of Shields, Jordan & Roe, 205 W. Wacker Drive, Chicago, Ill., are at present engaged on preliminary plans for a water works plant at Benzonia, Mich., and on sewage treatment plant rehabilitation for Palestine, Ill. A water works project at Princeton, Ill., is now under way under the supervision of this company. The organization is frequently called upon to give expert testimony in litigation on special assessment projects of all kinds, water works and sewage treatment works construction, mechanical and electrical equipment installations, lighting and heating projects and power development.

Consulting Briefs

Lewis L. Merritt, civil and structural engineer, Box 176, Wilmington, N. C., reports that he is at present working on right-of-way surveys for the Intra-Coastal Waterway from Beaufort, N. C., to the Cape Fear River for the State of North Carolina. He is also supervising construction of an airplane hangar for New Hanover County, N. C. Mr. Merritt is making a specialty of designing aeroplane hangars, mill buildings and commercial structures. He also prepares designs and supervises construction of wharves, piers and other marine structures and supervises dredging.

T. R. Atkinson, consulting engineer of Bismarck, N. D., announces that Fred F. Loy, sanitary engineer, has joined his staff. Atkinson is at present engaged on plans for a water works system for Terry, Mont., and on a water works installation and sewer improvements for Dickinson, N. D., as well as a storm sewer project for Bismarck, N. D. All work which this organization was supervising during 1929 has been completed.

Newell, Carter & Walsh, 822 Spalding Bldg., Portland, Oregon, has been called upon for expert testimony in the investigation of power rates and street car rates for the Portland Electric Power Co., and in the application of the Great Northern and Western Pacific for certificate of convenience and necessity for the construction of extensions in Northern California.

H. H. Holley, Larkins Bldg., Visalia, Calif., reports that he has been called upon to act as an expert witness in several irrigation cases, including the Tulare Irrigation District, et al., vs. Lindsay Strathmore Irrigation District; Peoples Ditch Co., et al., vs. Foothill Irrigation District; and Lakeside Ditch Co., et al., vs. Wutchumna Water Co.

L. J. Jordan, 1240 Harding Place, Charlotte, N. C., reports that at present he is supervising the construction of a sewerage system for the Kershaw Cotton Mills at Kershaw, S. C.

David A. Keefe, 711 South Main St., Athens, Pa., is now preparing plans and specifications for a 66 x 1,800-foot bridge over the Susquehanna River and for several small county bridges of steel and reinforced concrete.

At present, this organization is supervising the construction of the Market Street Bridge, a 96 x 1,600-foot structure over the Susquehanna River at Wilkes-Barre, Pa.

The Power Engineering Co., Metropolitan Life Bldg., Minneapolis, Minn., specializes in consulting practice on hydro-electric projects, and is at present engaged on plans for a hydro-electric development for the city of Rochester, Minn. J. W. Shuman, Secy.-Treas. of the organization, was recently called upon as a witness in the Lake-of-Woods case, the appeal by the U. S. Government against the damages allowed property owners on the lake shore, which came up before the District Court at St. Paul.

M. P. Homeyer, Littlefield Bldg., Austin, Tex., has completed plans for 15 miles of concrete pavement in Matagorda County on State Highway No. 58, and 8.36 miles of grading, drainage structures and concrete paving on Highway No. 72 in Lavaea County, and contracts have been awarded, the Matagorda job to Lacy Paving Co., Dallas, Texas, and the Lavaea job to Interstate Construction Co., Little Rock, Ark.

Notable Bridge Projects Now Being Designed and Built

Office of Robinson & Steinman, New York

HE St. Johns Bridge at Portland, Oregon, is one of the many interesting structures now being built from plans prepared by Robinson & Steinman, consulting engineers, 117 Liberty St., New York City. This bridge has a span of 1,207 feet, making it the longest span west of Detroit. Its clear height of 205 feet makes it the highest bridge over a navigable river and the use of twisted wire strands for the main cables makes it the longest suspension bridge with this type of cable construction. The bridge is located in the northern or the Peninsula section of Portland and spans the Willamette River connecting the two suburbs of St. Johns and Linnton.

Special attention was given to artistic considerations in the design of both substructure and superstructure. The graceful curves of the cable is a distinctive feature of the suspension type. The towers were developed so as to harmonize beauty with strength, the Gothic form being admirably adaptable to tower design. Twenty-five different types were given consideration, the final selection being made by the Commissioners of Multno-

mah County, Oregon.

The masonry was also developed to harmonize with the superstructure. The Gothic spirit was carried out in the lofty reinforced concrete piers of the viaduct approach, while the massive main piers and anchorages emphasize the purposes for which these portions of the structures are intended. The top of the cable bent pier on the east viaduct is 160 feet above the water. This pier contains about 3,700 cubic yards of masonry reinforced with 150 tons of steel and is believed to be the largest reinforced concrete rigid frame pier ever constructed. The east anchorage rests on concrete piles and contains 13,000 cubic yards of masonry.

A model test was made to check the mathematical analysis of the stresses in the tower. This model was built up of sheets of celluloid made to scale to represent the various cross sections. The model was over 4 feet in height, and was tested by Robinson & Steinman, engineers, under the supervision of Professor George E. Beggs at Princeton University.

The main cables are of twisted strands instead of the ordinary parallel wire normally used for suspension bridge cables. This depar300

D. B. Steinman

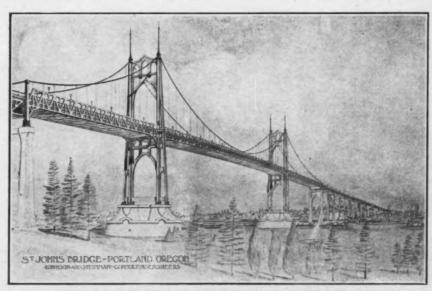
ture in cable construction was first tried on a long span in 1928, when it was used by Robinson & Steinman on a 950-foot bridge at Grand' Mere, Que. The strands for the St. Johns Bridge as well as those for the Grand' Mere Bridge were furnished by the Roebling Co. The St. Johns cable will be made up of 91 strands each of 1½ inches in diameter having a guaranteed modulus of elasticity of not less than 22,000,000.

The St. Johns Bridge was designed by Robinson & Steinman and is being constructed under their direction with R. Boblow as Resident Engineer. The work is being done under the authority of the Board of County Commissioners of Multnomah County, consisting of Grant Phegley, Chairman, Clay S. Morse and Fred W. German. The Highway Department is represented by George W. Buck, County Road Master, and M. E. Reed, County Bridge Engineer.

The Bear Creek Bridge at Sparrows Point, Md., is being built at the present time under the supervision and from the plans of Robinson & Steinman, who are also supervising the construction of the new east leaf of the

Hackensack River Bridge at Jersey City, N. J. In their offices these consultants are now working on plans for the Liberty Bridge, New York City, the Tacoma Narrows Bridge, Tacoma, Wash., the York River Bridge, Yorktown, Va., the Mississippi River Bridge at New Orleans, La., the San Francisco Bay Bridge to be located at San Rafael, Calif., and the bridges of the Cochabamba-Santa Cruz Railway in Bolivia.

Richard Cook, consulting engineer, Windom, Minn., is at present engaged on a storm sewer project for the city of Windom, a bass rearing pond for the State Game and Fish Department and several small projects.



The 1,207-Foot Span St. Johns River Bridge, Portland, Ore.

Hill Reporting on Water Supplies

MONG the work on which NICHOLAS S. HILL, Jr., 112 East 19th St., New York, is at present engaged are various reports on water supplies and sewerage and sewage treatment plants, including a report on the distribution system problems of the Bridgeport Hydraulic Co., at Bridgeport, Conn.; a report on water supply and water purification, and sewerage and sewage treatment for Bethel, Conn.; a report on proposed changes and enlargements at the pumping station of the Citizens Water Supply Co., at Great Neck, N. Y.; and a report on the size and location of a new one-half million gallon standpipe, reinforcements to the distribution system, improvements in the existing pumping station and studies of a proposed change in the location of the pumping station desired by the Westchester County Park Commission at Elmsford, N. Y.



Nicholas S. Hill, Jr.

Mr. Hill is also preparing reports on the best and most economical means of improving the present sewerage and sewage treatment facilities at New Rochelle, N. Y.; on the best means of purifying the supply from Indian Brook, Ossining, N. Y.; on the best method and relative economy of developing a future increased supply from the Raritan and Millstone Rivers and other sources for the Elizabethtown Water Co., Consolidated, of Eliza-

beth, N. J.; a valuation for rates, studies of required distribution system reinforcements and recommendations regarding the development of a new and additional supply from wells for the Princeton Water Co., Princeton, N. J.; and consulting services in connection with a report on the best means of developing a new and larger water supply for Regina, Saskatchewan.

In addition, Mr. Hill is designing a low lift pumping station, a 17,500,000-gallon daily sewage treatment plant, consisting of plain sedimentation with continuous sludge removal and separate sludge digestion, and appurtenant works for Utica, N. Y. He is also designing and supervising the construction of a 10,000,000gallon daily low and high lift pumping station and water filtration plant at the junction of the Raritan and Millstone Rivers for the Elizabethtown Water Co., Consolidated, of Elizabeth, N. J.; and is designing a system of trunk sewers and a 2,000,000-gallon daily sewage treatment plant to serve the Borough, University and Township of Princeton. Treatment at this plant will consist of plain sedimentation with separate sludge digestion, sprinkling filters and chlorination. The sludge drying beds will be glass-enclosed.

Two projects are now under way under the supervision of Mr. Hill, the construction of the Beach Avenue sewage ejector station and an increase in the capacity of the Park Avenue ejector station at Larchmont, N. Y.; and a project increasing the capacity of the existing masonry distributing reservoir at Nyack, N. Y., as well as lining and covering it with concrete.

This organization has been called upon for expert

testimony in the Hackensack Water Co. rate case, in a condemnation proceedings case for the Passaic Consolidated Water Co., and the rate case of the Scranton-Spring Brook Water Co.

Many Recent Additions to McDonald Staff for Industrial Reports and Plans

HE following new members have recently been added to the staff of McDonald & Co., Engineers and Architects, Southeastern Trust Bldg., Atlanta, Ga.: W. C. Clark, Textile Engineer; J. W. Houseal, Civil Engineer, J. Cregan, Construction Engineer, and three new architects, H. S. Chandler, C. R. Mylius and A. H. Abernethy.

The company is preparing industrial reports for the cities of Newnan, Ga., Memphis, Tenn., and Montgomery, Ala., and is working on plans for the Union Depot of the N. C. & St. L. Railroad at Atlanta; a new warehouse and office at Atlanta for the Mueller Co. of Decatur, Ill.; a southern plant for the B. F. Goodrich Co., to have a daily capacity of 5,000 tires, 5,000 tubes and 10,000 pairs of rubber shoes; and two new Publix Theatres, one in Montgomery, Ala., with a capacity of 1,500 seats and a similar theatre in Lynchburg, Va. All of these projects, with the exception of the theatre at Lynchburg, Va., are now under construction under the supervision of McDonald engineers.

Foundation Plans and Construction in Several States

HE firm of Moran & Proctor, 342 Madison Ave., New York, are at present preparing plans or are consulting on foundation plans for the following buildings: the Toledo Main Telephone Building and the Dayton Main Telephone Building for the Ohio Bell Telephone Co.; the City Bank Farmers Trust Building and the Battery Tower, New York City; the Aldred Bldg., Montreal; and the First National Bank Bldg., Atlanta, Ga.

Foundation work is now under way under the supervision of Moran & Proctor on the Aldred Bldg., in Montreal; One Wall St. Bldg., 120 Wall St., Bank of Manhattan Bldg., the International Tel. & Tel. Bldg., and the Battery Tower, in New York City; and the Lefcourt-Newark Bldg., Newark, N. J.

George L. Freeman, former Chief Engineer of the Foundation Co. of New York, joined the engineering organization of this company in August, 1929.

Texas Consultant Engaged on Water Works and Paving Plans

SANITARY sewer, paving and water works extension at Goliad, Texas, is one of the projects for which plans are now being prepared in the office of H. G. Olmsted, El Paso, Texas. This firm is also engaged on plans for a paving program and new water works system for Ganado, Texas, and is preparing a report on Deen's properties in Arizona and on oil prospects in Brewster County, Texas. Among the work now under way in Texas under Olmsted's supervision is a paving project at Alpine and a new water works at Coahoma.

Irrigation in California and Arizona

REPORT from James E. Sellers & Associates, 731-735 San Fernando Bldg., Los Angeles, Calif., and Phœnix, Ariz., states that the organization is working on reports for a project including 217,000 acres of irrigable land in Riverside County, Calif., and another irrigation project covering 110,000 acres of irrigable land in Arizona, as well as work in Palo Verde Mesa and Chueawalla Valley. They were consulting engineers on the Pomona, Calif., water system, the Phœnix water development of the Verde River, a utilities project for Yuma, Ariz., and the Colorado River power sites for various municipalities of Southern California.

A new resident engineer for the Phœnix office has recently been added to the staff.

Creek Straightening Job at Jacksonville Nears Completion

ORK on the McCoy's Creek improvement project for the city of Jacksonville, Fla., which is under the supervision of Jos. E. CRAIG, 228 Hogan St., Jacksonville, Fla., is now nearing completion. This improvement, which cost approximately \$610,000, includes a new outlet to the St. Johns River cut through a ridge 22 feet high and shortening the channel of the creek by some 1,500 feet. The work also included bulkheading the sides of the creek for 12,900 feet, building six concrete bridges and culverts, and dredging 280,000 cubic yards from the creek to provide a continuous straightened channel from the river with which to fill all of the swamp land along the creek to elevation 4.5, which will provide 41 acres of land along the creek for use as city parks or industrial property.

Consultants Change Firm Name

HE name of the firm of BAUER & KLING, 120 Broad St., Elizabeth, N. J., has recently been changed to BAUER-KLING & COUDERT. The firm is composed of J. L. Bauer, who is State Highway Engineer of New Jersey; Herman Kling, who is Supervisor of Roads for Union County, N. J., and Louis L. Coudert. The work of the State Highway Department and Union County is not handled by this organization, but they are at present preparing plans for the redesign of the sewer system of the city of Rahway, N. J., and are designing sewer systems for Clark Township and the Boro of Kenilworth, N. J. Bauer-Kling & Coudert are frequently called upon for expert testimony in cases involving land surveys, street and road construction and sewer work.

Weston & Sampson Reporting on Water Works and Waste Disposal

EPORTS and plans on waste disposal for the Stillwater Worsted Co., on a water works and sewerage system for Lunenberg, Mass., on waterworks extensions for Newbury, Mass., and on water works plants for several institutions and large estates are among the work now being handled in the office of Weston & Sampson, 14 Beacon St., Boston,

Projects now being constructed under the supervision

of this organization include a filtration plant for Oldtown, Maine, a drainage system for Wakefield, Mass., a sewerage system for Nantucket, Mass., additions to the water works of Exeter, N. H., Wakefield, R. I., and Deerfield, Mass., as well as for several institutions and estates and waste disposal plants for a few mills.

Among the cases on which this firm has been called for expert testimony are the Passaic Valley Water Commission vs. the Passaic Consolidated Water Co., and

Connecticut vs. Massachusetts.

Bridge Shop for Chinese Government

NE of the interesting projects now being planned by the office of WADDELL & HARDESTY, 150 Broadway, New York, is a bridge shop for the Chinese Government. Other bridge development plans on which this organization is working are the Grand Island bridges for the Niagara Frontier Bridge Commission, preliminary plans for the Mississippi River Bridge at New Orleans, and plans for the Elizabeth



J. A. L. Waddell

City Bridge in North Caro-

lina, for the Brunswick Pike

Bridge and the Tuckerton

Bridge for the New Jersey

the Maumee River Bridge at



Highway Commission, and a bridge for the City of New Orleans. Shortridge Hardesty also reports that bridge construction under the plans or supervision of this firm include

Toledo, Ohio, the Hacken-Blank & Stoller sack River bascule spans at Secaucus and Little Ferry, Shortridge Hardesty N. J., and the Suisan Bay lift span for the Southern Pacific Railroad.

Fuel Processing and Briquetting Plant in North Dakota

HE initial design for the construction of a fuel processing and briquetting plant at Lehigh, N. D., has recently been completed by RALPH W. RICHARDSON, 301 Fourth and Robert Bldg., St. Paul, Minn., and this organization is still doing some work in connection with this property. The firm is now preparing reports and plans for an artesian well and water works at Hastings, Minn., and an extension to a canning factory and power plant at Blue Earth, Minn., as well as a well and water works for a canning factory at Montgomery, Minn., additions to the power plant at the City and County Hospital of St. Paul, Minn., and preliminary plans and report for a power plant at St. Catherine's College and Novitiate in St. Paul.

The personnel of this firm includes R. W. Richardson, Owner, R. E. Patrick, Civil Engineer, and F. W. Gor-

man, Structural Engineer.

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The Editor Comments —

The Biggest Show on Earth

In the language of the famed publicity agent of the consolidated circuses of these United States, the rapidly approaching Road Show in Atlantic City will be the most comprehensive aggregation of labor saving mechanistic devices ever displayed for the edification of plutocratic, aristocratic and dyed-in-the-wool contractors. The Road Show is not a circus. To get the most out of it in the week the machines are on exhibit, you need at least two whole days devoted to a systematic trip studying the various pieces of equipment carefully.

Don't forget the fact that the American Road Builders Association committees have put a lot of thought into the papers which are to be presented at the Atlantic City Auditorium during the Show, January 13-16, and the papers are going to be more valuable than ever before.

Office Hours

So that I can have an opportunity to meet as many of my friends as possible at the Road Show, I am planning definitely to have office hours each morning from 11 to 12 at the Contractors and Engineers Monthly Booth, No. 132-133, on the main floor of the auditorium. I shall be more than glad to see any of our readers, particularly those whom I have met personally on my various trips and who have been so courteous in taking me over their jobs.

"New-Fangled Equipment Is High Pressure Stuff"

On one of my trips this summer, I talked with a contractor who made this very broad statement, "This newfangled equipment is high pressure stuff. I bought around \$60,000 worth from a glib salesman and have had nothing but grief all season."

As this statement was a severe indictment of the manufacturer, distributor and salesman, I asked a few leading questions to try to find out where the trouble was.

The first grief lay in the fact that the contractor had been unmercifully held up by breakdowns of some second-hand motor trucks which he had picked up cheap and which he had not bothered to overhaul before he put them on the job. No wonder the new paver wasn't producing as much concrete slab as it should when the truck fleet wasn't delivering the materials to the skip fast enough!

There had been some slight adjustments necessary on the paver, the finishing machine and other pieces of equipment, but the contractor did not have a single A-1 master mechanic in his employ and he hadn't bothered to ask the distributor for any service.

Service Is the Distributor's Middle Name

If that contractor had only realized it, next to selling a machine, the biggest delight of any substantial distributor is to be called on for a service man to go over a machine which is a little balky. The day of making a sale and then forgetting it has gone by. Every distributor who amounts to anything today has a real Service Department that is putting in good licks, seeing that the machines sold this year and last year and the year before are operating satisfactorily.

How One Contractor Overcame Mechanical Difficulties

On one job I have already described in these pages, the contractor hired two mixer men. He said he couldn't take a chance with one mixer man being injured or laid up by illness and have the paver operated by an inexperienced man, so he hired a second mixer operator and kept him on the job at full pay all of the time. Did he loaf? I'll say he didn't. That second operator was a first rate mechanic and earned his salt day in and day out by overhauling trucks and other pieces of equipment as soon as they showed the least sign of trouble.

Greetings

May the New Year we are just starting bring you continued good health and greater prosperity.

I headore Reed Kendall



One of Two Bay City Tractor Shovels Owned by the Carleton Co., New York, and Operating on the Fulton Street Subway, Route 110, Section 1 and 2, in Brooklyn, N. Y. These Two Machines Have Operated Two 8-Hour Shifts Daily with Union. Operators Drawing \$91 per Week. They Have Worked Between the Timbers Cleaning Out Material Left by the Shovels Which Were Used to Open Up the Cut

Construction Industry News

National Equipment Corp., a consolidation of the Koehring and T. L. Smith Companies of Milwaukee, the Insley Manufacturing Co. of Indianapolis, the Parsons Co. of Newton, Iowa, and the Kwik-Mix Concrete Mixer Co. of Port Washington, Wis., became an operating company on January 1, 1930. Philip A. Koehring is President and General Manager of the National Equipment Corp., with headquarters at 31st St. and Concordia Ave., Milwaukee. R. E. Brooks, for a number of years engaged in the equipment business in New York, was recently elected Vice President and will be in charge of sales. Sales, service, advertising and accounting departments have been centralized, thereby rendering a more efficient service to customers. Other officers of the National Equipment Corp., are: W. H. Insley, Vice President; H. E. Smith, Vice President; H. C. Mc-Cardell, Vice President; W. J. Koehring, Vice President; W. J. Zimmers, Secretary; G. E. Long, Comptroller; and C. A. Koehring, Assistant Treasurer.

Caterpillar Tractor Co., San Leandro, Calif., has announced another price reduction in all the major items of Caterpillar machinery. This reduction was made possible by the recent Peoria combine and is in accordance with its policy of passing on to the public the benefit of increased efficiency resulting from enlarged production.

Sullivan Machinery Co., Chicago, Ill., has announced the establishment of a branch office at Johannesburg, South Africa, as Sullivan Machinery Co., Africa (Proprietary), Ltd., Geneva House, Johannesburg, Transvaal. Charles C. Smith, formerly of the Sullivan staff and more recently manager for Barlow's Johannesburg (Proprietary), Ltd., Sullivan agents in South Africa, will be Manager of the new office. Barlow's Johannesburg (Proprietary), Ltd., and Thos. Barlow & Sons (S. A.), Ltd., Durban, Natal, will continue as Sullivan agents in their respective territories. A branch office, warehouse and service station for Sullivan equipment and particularly for Sullivan diamond core drills, has been established at N'Dola, in Northern Rhodesia.

Christic Crawlers, Inc., 156 Wilson Ave., Newark, N. J., in extending its truck-tractor equipment activities has adopted the new name Trucktor, to better describe its product. The same officers, management and personnel will continue under the name of the Trucktor Corp.

Moritz-Bennett Corp., Effingham, Ill., has been organized as successor to the Highway Shoulder Machine Co. The personnel and ownership of the new organization remains practically the same as the former company. The officers are: E. A. Moritz, President; W. M. Bennett, Vice President in Charge of Sales; C. J. Moritz, Vice President and Treasurer; Sarah Stern, Secretary; J. S. Raleigh, Manager, Production and Service; B. C. Comer, Plant Superintendent.

R. H. Beaumont Co., Philadelphia, Pa., has transferred H. S. Ford, Eastern Sales Manager, to the New York Office at 50 Church Street. H. B. Mosley, New York Manager of the Beaumont Mfg. Co., a division of R. H. Beaumont Co., is now connected with the Philadelphia office of the latter company.

Trackson Co., 500 Clinton St., Milwaukee, Wis., has announced the appointment of the Stannard-Arnold Machinery Co., 149 West Second South St., Salt Lake City, Utah, as distributors of Trackson tractor equipment for the McCormick-Deering tractor. The territory to be covered by this company includes Utah, and part of Idaho, Nevada and Wyoming.

A. W. French & Co., Division of Blaw-Knox Co., Pitts-burgh, Pa., has announced the resignation of E. A. Allen as Secretary and Treasurer. Mr. Allen has been associated with A. W. French & Co., since its organization and with William Ord developed the Ord concrete road finishing machine.

Building a Railway Station in Close Quarters

(Continued from page 109)

BLAST PLATES

As a protection against the deleterious effect of the blasts from locomotives on the concrete of the viaduct and station decks, plates of copper molybdenum steel, ½-inch thick, were bolted to the under side of the concrete, directly over and colinear with the tracks. This alloyed steel is reputed to offer high resistance to the corrosive action of the sulphur gases in the locomotive blast.

Erection was effected by means of two "dutchmen," or single stick breast derricks, one on each side of the track. Anchor bolts had been inserted in the forms prior to the pouring of the concrete, and by means of socket nuts of copper molybdenum steel, the ends of the bolts were protected from corrosion by the engine gases.

INTERTRACK FENCE

In order to prevent the crossing of mainline tracks from one platform to another, 1,000 feet of iron fence were erected. Instead of the usual bolted-up type of fence, the panels were so arranged as to be readily removed by maintenance of way forces when replacing ties or resurfacing track.

Pintles welded to the upper and lower rails of each section fitted into slotted holes in angles riveted to the fence posts, and a panel could therefore be removed or replaced in a few seconds.

Gates at paved crossings are of the sliding type so that when unlatched they cannot swing out and foul the mainline.

PERSONNEL

The plans and specifications for the new Delmar Passenger Station were prepared under the direction of R. E. Mohr, Architect of the Wabash Railway Co., ably assisted by F. R. Michael, Assistant Engineer.

The construction work was carried out by Dwight P. Robinson & Co., Inc., Division of the United Engineers & Constructors, Inc., of Philadelphia, Pa., the field personnel consisting solely of J. Buckley Bryan, Superindendent of Construction; Gerald Dollard, Field Accountant and Cost Engineer; and Clifford Young, Field Engineer.

Road Show Notes

J. D. Adams Co., Indianapolis, Ind., will exhibit an improved Adams motor grader, known as No. 101, which has a number of new and interesting features. The Adams exhibit will also include the latest types of Adams adjustable wheel graders and several display pieces. A continuous motion picture will be another feature of the exhibit, which will be located on the main floor in Space 207, along the right hand wall.



The New Adams Motor Grader No. 101

Aeroil Burner Co., Inc., Park Ave. at 13th St., West New York, N. J., will exhibit small models of oil-burning asphalt heaters, paving tool heaters, concrete heaters, torches, portable oil burners, hand spraying attachments and other of their products.

Alloy Cast Steel Co., Marion, Ohio, will exhibit its regular line of steel castings in Booth 318 on the main floor in front of the stage.

American Hoist & Derrick Co., St. Paul, Minn., will have on display in Space 209 an American Gopher gasoline operated 1-yard combination shovel-crane or dragline.

American Manganese Steel Co., Chicago Heights, Ill., will exhibit an assortment of Amsco manganese steel castings, such as crawler links and sprockets, dipper teeth, etc., and a new 10-ton trailer dump wagon crawler unit, in Booth No. A-105 on the main floor. The following representatives will be at the convention: W. G. Nichols, Pres.; A. W. Daniels, Gen. Sales Mgr.; J. M. Murtaugh, Asst. Gen. Sales Mgr.; W. M. Black, Eastern Sales Mgr.; F. O. Rush, Asst. Eastern Sales Mgr.; B. F. Clark, Sales Engr.; C. E. Wallander, Sales Engr.; and Claude Rorabeck, Mgr. of Engineering Div.

American Steam Pump Co., Battle Creek, Mich., will exhibit four models of the new Redi-Prime centrifugal pump. There will be a small 2-inch automatically primed pump, one model motor driven and the other gas engine driven with a Briggs & Stratton engine. Another model will be a special 3-inch portable unit and also one 3-inch unit mounted on a four-wheel truck direct connected to a LeRoi gas engine. The exhibit will be in Space 608 with B. D. Barton in charge.

American Steel & Wire Co., 208 South LaSalle St., Chicago, Ill., will exhibit in Space 130 its concrete reinforcement fabrics, triangular mesh and electric weld for reinforcement of streets and highways, steel posts for highway signs and snow fences, American wire rope and Perfected highway guard cables. The following members of the staff will be in attendance: B. S. Pease, O. T. Allen, P. T. Coons, D. E. Hinman, R. S. Green, G. H.

Cruttenden, A. S. Lutz, George Hawthorne, E. Kubitz, P. R. Conly, W. H. Cordes and R. Francisco.

American Tar Products Co., Koppers Bldg., Pittsburgh, Pa., will have on exhibit pictures of Tarmac roads and literature on Tarmac and souvenirs will be available. P. L. Griffiths will be in charge.

American Tractor Equipment Co., 5301 Horton St., Oakland, Calif., will exhibit a Model S-8 Ateco hydraulic dirtmover, a Model B-8 hydraulic bulldozer and a Model R-5 hydraulic searifier in conjunction with the tractors with which they are designed to be used. This company will have Space 509.

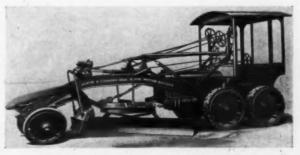
Anthony Co., Inc., Streator, Ill., will exhibit the new Anthony rotating power hoist dump body, which has a number of new features and improvements. The gravity type and the hand hoist bodies will also be on display in Space 480 with W. G. Anthony, Pres.; R. R. Howard, Sales Mgr.; A. L. Smith, E. J. Lucas, J. H. Monning, C. H. Worrells, E. L. Flanigan and C. H. Montelius in attendance.

Armco Culvert Manufacturers Assn., Middletown, Ohio, will feature the latest developments in drainage products and methods. Specimens of products accompanied with explanatory films and charts will be on display, with the Armco paved invert culvert and the Armco jacking method specially featured. The exhibit will occupy Space 103 with Anton S. Rosing, Publicity Mgr., in charge. Other Armco representatives who will be in attendance are H. E. Cotton, A. J. Gloyd, J. B. Morrison, Mont C. Noble, Howard See and W. H. Spindler.

Athey Truss Wheel Co., 130 North Wells St., Chicago, Ill., will exhibit its complete line of dump equipment, including the Athey 3-way dump trailer and the rear dump trailer in various sizes, into which has recently been incorporated a number of improvements.

Atlas Imperial Diesel Engine Co., Oakland, Calif., will have on display its latest models, including the 3-cylinder 5¾-inch bore by 8-inch stroke shovel engine, the 4-cylinder 7-inch bore by 8½-inch stroke power unit and the 6-cylinder 9-inch bore by 10½-inch stroke enclosed industrial type engine. F. H. Kilberry, General Mgr., George N. Somerville, Chief Engineer and J. George Oetzel and Earnest Parker, both of the Chicago office, will be in attendance.

Austin Machinery Corp., 2969-3015 Lake Shore Drive, Muskegon, Mich., will exhibit a Model 105 Little Wonder public service ditcher and a backfiller in Space 222 on the main aisle on the main floor.



The New Austin Western Dual Drive Grader

Austin-Western Road Machinery Co., 400 North Michigan Ave., Chicago, Ill., will show for the first time two new motor graders, the Austin dual-drive grader and a

small dual-drive unit, and a new Western rotary crusher. The Autocrat and Cadet rollers, a 5-yard direct hitch crawler wagon and a 12-foot leaning-wheel blade grader will also be on display. The exhibit will be located on the main floor, close to the main entrance with W. Cornwelle in charge.

Baker Manufacturing Co., Springfield, Ill., will exhibit the latest models of Baker Maney self-loading scrapers, rotary scrapers, bulldozers, road maintainers and snow plows, all of which will have new improvements with especially important new features on the Baker Maney scrapers. J. G. Miller, Vice Pres. and Sales Mgr., will be in charge of the exhibit which will occupy Space 149.

Barber Asphalt Co., 1600 Arch St., Philadelphia, Pa., will distribute literature describing Trinidad and Bermudez Native Lake asphalt for the construction of city streets or country roads; Curcrete, an asphalt emulsion used in curing concrete roads; Iroquois road building machinery, including asphalt mixing plants, steam jacketed pipe, pumps and fittings, road rollers and paving tools. Samples of valves and fittings made of Barberite, a non-corrosive, acid-resisting alloy, will also be on display. Representatives who will be at the booth in Space 138 will include C. W. Bayliss, Vice Pres., in charge of Sales; J. E. Morris, Mgr., Street & Road Dept.; W. F. Worrell, Mgr., Iroquois Sales Dept.; Frank J. Chester, Mgr., Pittsburgh Dist.; L. D. Lytle, Mgr., New York Dist.; W. F. Hartzell, Adv. Mgr., as well as sales representatives from the various departments.

Barber-Greene Co., Aurora, Ill., will have Booth 220, where will be shown a 51-foot permanent belt conveyor in operation, a truck-mounted Style N plain belt conveyor, a wheel-mounted Model 28 and a crawler mounted Model 42 loaders, and a Model 44-C vertical boom ditcher. The Model 42 loader will be equipped with the Leahy No-Blind vibrating screen. All of the machines will be shown in actual operation in the movie projection booth. H. H. Barber, Pres.; W. B. Greene, Vice Pres.; J. F. Janda, Chief Engr.; J. M. Bruns, Ditcher Engr.; W. B. Holder, Coal Engr.; D. B. Frisbie, Loader Engr.; Jack Turner, Adv. Mgr; and S. E. Faircloth, Supt.; will represent the home office. Men from the Eastern offices will be E. F. Lamprey, Cambridge, Mass.; S. D. Brown, New York City; J. P. Fogarty, Utica, N. Y.; F. S. Sawyer, Philadelphia; J. A. Gurney, Pittsburgh; E. D. Cassel, Cleveland, and Paul Frederick, Cincinnati, Ohio.

Barnes Manufacturing Co., Mansfield, Ohio, will exhibit a 35 Triplex positive oiling road pump, L-308-A Duplex plunger trench pump, 771 lift and force diaphragm pump, 772 lift and force double diaphragm pump, 691 portable centrifugal unit, 703 self-priming centrifugal pump and a 705-A standard centrifugal pump.

Barrett Co., 40 Rector St., New York, will exhibit one of the latest Tarvia distributor trucks as well as the Tarvia binders and surface treating materials and several new processes and materials. The exhibit, which will be located on the main floor in Space 109, will be in general charge of P. K. Sheidler, Mgr., and George E. Martin, Consulting Engineer, both of the General Tarvia Dept.

The C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland, Ohio, will show a new model of the Bartlett-Snow movable concrete body mounted on a 5-ton truck and equipped with a high-lift hoist. Moving pictures of the Bartlett-Snow body under actual working conditions will be shown continuously. "The Concrete Body Book" now being published, will be distributed. Lloyd R. Wilson, Manager of Sales of Bartlett-Snow bodies,

will be in attendance, together with other representatives at Space 407.

Bay City Shovels, Inc., Bay City, Mich., will show in Space 309 three different types and sizes of convertible power shovels, including a Bay City 10-ton tractor shovel, the Model K 15-ton, full-revolving, crawler-mounted shovel and the Model R 34-yard, 26-ton, heavy duty shovel.

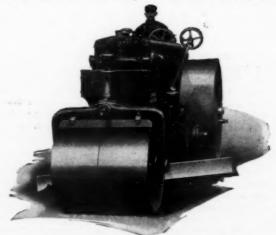
Blackhawk Mfg. Co., Milwaukee, Wis., will show, in addition to its complete line of hydraulic jacks from 1 to 75 tons capacity, a complete line of quick detachable socket wrenches having an exclusive lock-on feature, and Chrome Vanadium open end wrenches, at Booth 554.

Blaw-Knox Co., Pittsburgh, Pa., will have on exhibition a Blaw-Knox batcherplant, bin, agitator truck body, Dreadnaught road form, Universal forms, a 1-yard inundator and water measuring equipment, electroforged steel grating, Floorgard, turntables and a complete line of clamshell and dragline buckets. The exhibit of the A. W. French Co. Division will be part of the Blaw-Knox exhibit and will include the Ord finishing machine, a Nu-Method finish grader and the Ball wagon grader.

Brookville Locomotive Co., Brookville, Pa., will display two locomotives covering two of the five new models on which distribution will be started on January 1, 1930. The first is a 4-ton, 36-inch gage, with Model AA power unit and six working speeds and the second, a 24-inch gage, 6-ton locomotive with Model 20 McCormick-Deering power plant, having four speeds. A 5-ton, Model BL-5, 36-inch gage Brookville United will also be displayed by the Allis-Chalmers Mfg. Co. The Brookville booth is No. 314 on the main floor.

Buda Co., Harvey, Ill., will have on display a complete line of its engines, among which will be the Buda-M.A.N. diesel engine, a 120-horsepower diesel power unit, a 180-horsepower diesel engine and a new 6-cylinder model of a new series of gasoline engines which will be shown for the first time at the Road Show. The booth will occupy Space 238, with R. K. Mangan, Sales Mgr., Industrial Div., in charge.

Buffalo-Springfield Roller Co., Springfield, Ohio, will exhibit five models of its rollers in some of the larger sizes. They will be a 10-ton standard motor-driven 3-wheel roller with scarifier, an 8-ton motor-driven 3-wheel roller with scarifier and grading blade, a 10-ton heavy duty motor-driven tandem, an 8-ton steam-driven tandem and a 17-ton gasoline motor-driven special maintenance roller which



An 8-ton Buffalo-Springfield Roller with Scarifier and Grading Blade

will be exhibited for the first time. The exhibit will be in Space 300 at the north wall on the main floor in charge of G. P. White and R. Logsdon.

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Buhl Co., 407 So. Dearborn St., Chicago, Ill., will have on display a WB-110 compressor on a high speed trailer, a WB-110 on standard steel wheels, a WB-220 on rubber tired wheels and a 36-foot portable compressor known as 30-DP in Space 453 and 469. W. I. Buhl will be in charge, assisted by George R. Stege, Vice Pres.; George R. Stege, Jr., Secy.-Treas.; F. C. Marshall and Robert I. Dick, of the Engineering Dept.



The WB-110 Compressor

Butler Bin Co., Waukesha, Wis., will have Space 231 on the main floor of the Convention Hall where their exhibit will consist of a 40-cubic yard contractors' bin divided into three compartments and equipped with the latest type weighing hopper; a cement weighing hopper, a quick adjustable volumetric proportioning hopper, a small model of a V 40-cubic yard two-compartment bin carrying the latest type of volumetric proportioning hoppers, a small model of a weight proportioning hopper using removable weights, a roller gate and a duplex gate. The exhibit will be in charge of M. R. Butler, A. R. Morton, C. E. Riblet and M. A. Kelly.

Philip Carey Co., Cincinnati, Ohio, will exhibit the Elastite expansion joint, rail filler, asphalt plank and rail-road crossing. Representatives in attendance at Space 530 will be C. V. R. Fullenwider and R. M. Simrall of the Elastite Products Div.

The C. H. & E. Mfg. Co., Inc., Clinton & Mineral Sts., Milwaukee, Wis., will exhibit a new No. 28 saw rig with Texrope drive, a No. 23 double drum hoist, powered by a 15-horsepower gasoline engine, a new design Mud-Hen diaphragm pump, a new model Triplex road pump with Texrope drive and drop forged crankshaft, and a sewage and trash pump.

Chain Belt Co., Milwaukee, Wis., will have a large exhibit of its various products. The Construction Equipment Div. will occupy Space 221 and will display the latest models of Rex mixers, the 1930 Rex 27-E paver, a complete line of Rex pumps, plaster mixers, saw rigs and contractors' elevators. The Chain Div., with the Stearns Conveyor Co., a division of Chain Belt Co., will unite with the Federal Malleable Co., Interstate Drop Forge Co., and the Sivyer Steel Casting Co., in Space 226, where Rex chains and transmissions, Rex-Stearns belt conveyors, Sivyer alloy steel castings, Federal malleable iron eastings and Interstate drop forgings will be on exhibition. At this exhibit Alfred Abelt will be in charge for the Chain Div., of Chain Belt; while Kurt Siemens, Sales Mgr., and W. J. MacNeill, Superintendent, will represent Federal Malleable Co.; Charles Stone, Pres., and Benton Warder for Interstate Drop Forge Co.; and George M. Dyke, Vice Pres. and Lynn McKnight for Stearns Conveyor Co.

Chausse Oil Burner Co., 1227 West Beardsley Ave., Elkhart, Ind., will feature several new items of equipment. In addition to the new Model E-4 portable asphalt plant for street and highway maintenance, there will also be exhibited the Model H-1 handmixing, hot patching outfit and a new model of a crack filler for use with any standard portable compressor. Other



A Chausse Portable Incinerator

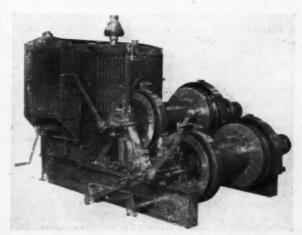
equipment on display will be oil burning tar kettles, surface heaters, concrete mixer heaters and various sizes of kerosene torches.

Chevrolet Motor Co., Detroit, Mich., will include in its exhibit of trucks a Hughes-Keenan 1½-yard gravity dump body mounted on a Chevrolet truck.

The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland, Ohio, will show the Cleveland Baby Digger, the Cleveland Pioneer trencher and the Cleveland tamperbackfiller, at Booth 427. A. J. Penote, A. V. Jones, J. R. Overs, F. H. Chatterton, L. G. Meyers and V. S. Penote, who will be in charge of the exhibit, will be in attendance from January 13 to 18.

Clinton Motors Corp., Reading, Pa., will exhibit a 3-cubic yard Clinton concrete truck with high-lift hoist; a 3-cubic yard Clinton Concrete Conveyor-Conditioner and regular dump body hoist mounted on a Mack truck; a 2-cubic yard Clinton Concrete Conveyor-Conditioner and highlift hoist on a Mack truck; a 3-cubic yard Conveyor-Conditioner with regular dump body hoist and a 2-cubic yard Conveyor-Conditioner with high-lift hoist, mounted on White trucks and a Chevrolet truck with a 6-wheel attachment equipped with a 1-cubic yard Conveyor-Conditioner.

Clyde Iron Works Sales Co., Duluth, Minn., will exhibit in Space 137 in the main arena a new double drum builders' type of contractors' hoist with bronze bushed drums, all steel electrically welded bed and powered by an 80-horsepower Le Roi motor.



Clyde Double Drum Builders' Type of Contractors' Hoist

Colphalt Co. of Ohio, Cleveland, Ohio, will have on exhibition the Corkin expansion joint and Colphalt, an asphaltic emulsion. Columbia Products Co., Barberton, Ohio, will have on display a miniature highway, depicting a calcium chloride treated gravel road, and including a miniature truck and equipment for the spreading operation. The layout will also include complete detail operation, in miniature, in a concrete paving job, showing how calcium chloride is incorporated in the mix for concrete curing and early strength.

Concrete Surfacing Machine Co., Cincinnati, Ohio, will exhibit two Berg HiWay surfacers, electrically equipped, for demonstration only, two surfacers equipped with new 3-horsepower air cooled gas engines, Berg Model A electric surfacers and finishers with attachments, a Berg cleaning tool for removing paint and rust from steel, which has never been shown before, a display board showing the complete parts constituting Berg surfacers and finishers, and a concrete slab for demonstrating the surfacers.

Conneaut Shovel Co., Conneaut, Ohio, will exhibit and demonstrate its complete line of hand shovels for contractors' use.

Construction Machinery Co., Waterloo, Iowa, will show for the first time the new Master 14 mixer and the Wonder 7 mixer with pivoted loader, as well as one of the light duty hoists and a Mechanical Hoeman plaster mixer.

Continental Motors Corp., Muskegon, Mich., will feature the Model H 24, one of the new series of 4-cylinder, slow speed type industrial engines recently developed. Other engines in the exhibit will include a number of the Red Seal engines and power units, some of the L-head type and others of the valve-in-head design, all of which are adapted to road building purposes. The exhibit will be in Space G239, with Stewart Nixon in charge, assisted by L. J. Kanitz, Industrial Div. Mgr., G. F. Swarthout, Arch Smith, Steve Evelyn, Max Schachner, Arch Sampson, Sid Harris and A. D. Chandler, Sales Engineers.

Davey Compressor Co., Kent, Ohio, will have on exhibition a Davey air compressor mounted on a 10-20 McCormick-Deering tractor and another unit mounted on a Caterpillar Twenty.

DeWalt Products Corp., Leola, Pa., will exhibit for the first time the new Model D contractors' saw, constructed with direct drive power in a portable unit to meet the demands of the general contractor. Paul Gardner, Pres., and E. J. Gray, Div. Mgr., will be in daily attendance at the booth in Space 638.

Diamond Iron Works, Inc., Minneapolis, Minn., will feature its new double unit crushing and screening plant, which is novel in that it is equipped with a primary jaw crusher and a secondary roll crusher. The complete unit is mounted on wheels.

Domestic Engine & Pump Co., Shippensburg, Pa., will show its line of power pumps, including the 1930 model of the Giant Road Builders' pump and the improved line of automatic priming centrifugal pumps in Space 201.

Dow Chemical Co., Midland, Mich., will exhibit the standard methods of using Dowflake, both as an admixture in portland cement concrete and also for bonding and dustproofing roads, with particular attention to the demonstration of the deliquescent properties of Dowflake. Don Williams, Asst. Sales Mgr., will be in charge.

Eisemann Magneto Corp., 165 Broadway, New York, will have on exhibition a new line of high-tension magnetos, designated as type GV and designed for use in high speed, high compression types of engines of from 1 to 6 cylinders. In addition, the new GL magnetos for medium and low compression engines will be shown. Those representing the company will be William N. Shaw, Pres.; T. E. Kennedy, General Sales Mgr.; O. S. Stanley, Branch Mgr. in Chicago; B. B. Woodford, Asst. Sales Mgr., New York, and I. W. Edwards of Detroit.



The New EWC High Speed Machinery Trailer

Electric Wheel Co., Quincy, Ill., will feature new EWC high speed machinery trailers for machinery mounting.

Eric Steel Construction Co., Eric, Pa., will have on display its new AggreMeter plant for loading mixer trucks, a combination volume-weighing AggreMeter and a Multipower clamshell bucket as well as the regular Peerless buckets.

E. D. Etnyre & Co., Inc., Oregon, Ill., will display a 1,000-gallon Model F distributor with insulated tank mounted on a Sterling Model DW-20, 5-ton chassis with auxiliary transmission and pneumatic tires. G. M. Etnyre, Secy.-Treas., will have charge of the exhibit in Booth No. 129, and E. D. Etnyre, J. L. Long and Geo. E. Pearson, are also expected to attend.



A Euclid Automatic Wheel Scraper

Euclid Crane & Hoist Co., Euclid, Ohio, will exhibit an improved Euclid track-wheel wagon, a new rotary fresno scraper and an automatic wheel scraper in Space 468.

Everhot Manufacturing Co., Maywood, Ill., will exhibit its complete line of branding irons, torches, soldering attachments and irons, and Taylor collapsible horses.

The Fafnir Bearing Co., New Britain, Conn., will exhibit a complete line of Fafnir bearings for road building and contracting machinery, featuring deep-grooved races and



A Fafnir Bearing

larger balls of chrome - molybdenum steel hardened throughout and single and double row radial and radial thrust bearings and thrust



W-K-M Side Boom UNIT

At last! A unit attachable to "Caterpillar" tractors, which permits full use of the drawbar. Two men can install it in a few hours' time. The W-K-M Side Boom Unit makes your "Caterpillar" tractor more than just a pulling machine. For example, when equipped with a clamshell bucket it can be used for loading and unloading cars, trucks, et cetera. The Unit can also be operated in conjunction with dragline and throw-out buckets, magnet attachments and other lifting apparatus. W-K-M Side Boom Units have a swinging radius of 160°, and can be extended to a length of 23 feet.

Obtain the USE of these—

W-K-M Side Boom Unit on display at American Road Builders' Show in Booth Number 328





Retain this DRAWBAR feature

The W-K-M CO.Inc.

OIL FIELD-PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON - TEXAS

EXPORT OFFICE: 74 TRINITY PLACE, NEW YORK, N. Y.

bearings in both self-aligning and rigid types. Among those in attendance in Booth 609 will be E. R. Carter, Vice Pres.; D. M. Davidson, Adv. Mgr., and R. W. Powell, C. W. Kramlich, D. L. Holbrook, and W. L. Rager, Sales Engineers.

Fate-Root-Heath Co., Plymouth Locomotive Works, Plymouth, Ohio, will exhibit a new model 30-ton standard gage gasoline locomotive equipped with an 8-cylinder engine.

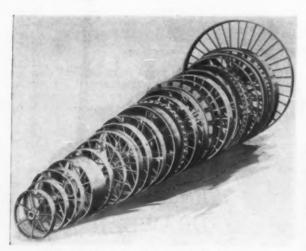
Flintkote Roads, Inc., 2326 Pershing Square Bldg., New York, will offer at Space 472 an opportunity to secure full information in regard to Colas, a new emulsion of asphalt for use as a road binder. Colonel H. L. Bowlby, V. L. Ostrander, R. G. Wace, O. H. Kollock, R. M. Littlefield, K. S. Bowman, E. D. Crumb, T. F. O'Meara and C. W. Perry will be in attendance.

Foote Bros. Gear & Machine Co., 111 N. Canal St., Chicago, Ill., will exhibit all the latest models of Bates Steel Mules and Stockland road graders, including the Steel Mule tractors 30, 40 and 80, a Stockland 30 horse-drawn patrol, a Stockland 30 for horses or light tractors, Stockland 40 for reconstruction and maintenance, the 35-8, a general utility grader and the 80-12 and 50-10 Giant road builders.

Foote Co., Inc., Nunda, N. Y., will exhibit in Space 211 the 1930 Model of the MultiFoote paver.

Four Wheel Drive Auto Co., Clintonville, Wis., will exhibit two of its 1930 models, the FWD Commercial Utility of 3½ tons capacity and the FWD H6 of 2-ton capacity, in Space 228 on the main floor.

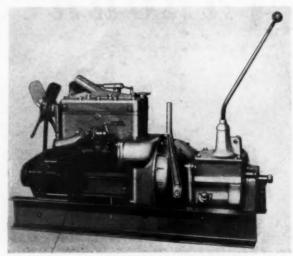
French & Hecht, Inc., Davenport, Iowa, will display its complete line of wheels for almost every purpose. The booth will occupy Space 654 and W. F. Heesch, Gen. Mgr., will be in charge.



The Complete Line of French & Hecht Wheeis

Fruehauf Trailer Co., 10940 Harper Ave., Detroit, Mich., will display a Fruehauf heavy-duty carryall, Type D, suitable for the transportation of heavy machinery and equipment. On this will be mounted a section of the rear underconstruction of the Fruehauf Type G in order that the special construction may be seen. This exhibit, which will be located in Space 112 in the southeast corner just to the left of the main entrance, will be in charge of G. W.

Chamberlin, Director of Sales, who will be assisted by W. G. Retzlaff, C. L. Schneider, Ike S. Byrum, H. E. Yale and A. E. Hickey.



The Fuller & Johnson Model BC Engine

Fuller & Johnson Manufacturing Co., Madison, Wis., will exhibit the Model N6 single cylinder horizontal line of engines with the Model AH 4 to 6-horsepower single cylinder vertical unit, the Model BB 3 to 5-horsepower 2-cylinder, Model BC 6 to 10-horsepower 4-cylinder, Models AX and AXK 20 to 25 and 25 to 30-horsepower 4-cylinder units in addition to one or two other power units. G. D. Stone, General Sales Mgr., will be in charge of the exhibit while C. L. McMullen, Pres. and Gen. Mgr., and E. D. McClelland, Chief Engineer, will also be present.

Fuller & Sons Manufacturing Co., Div. of the Unit Corp. of America, Milwaukee, Wis., will exhibit for the first time a new five-speed transmission designed for use in road builders' and contractors' dump trucks of 3 to 4-ton capacity. The exhibit, which will be located in Space 434, will also include five models representing the complete line of heavy-duty transmission.

Galion Iron Works & Manufacturing Co., Galion, Ohio, will exhibit in Spaces 430 and 481 improved designs in road rollers, tandem rollers, leaning wheel graders and motor patrol graders.

General Wheelbarrow Co., Cleveland, Ohio, will have Booth 614, Section F, where it will exhibit a General No. 400 concrete cart with unbreakable axle, a narrow front measuring tray barrow and a Planetainer, designed for maintenance work on roads and airport landing fields. There will also be an exhibit of Empire road grader blades by the Empire Plow Co., which is associated with the General Wheelbarrow Co.

W. S. Godwin Co., Race & McComas Sts., Baltimore, Md., will exhibit steel paving guards for protecting the edges of streets, curbs, etc., and also for preventing the disintegration of paving adjacent to any type of rails in paved railways.

Good Roads Machinery Co., Inc., Kennett Square, Pa., has been assigned Space 518 and will have on display there a No. 1030 Champion roller bearing reduction crusher, a Good Roads Autograder, a Dreadnaught heavy duty power grader, a 3-cubic yard RMC concrete carrier

Contractors like Frazier Davis, rushing a line in between St. Louis and Kansas City, have found it pays to have Parsons on the digging end of the job.

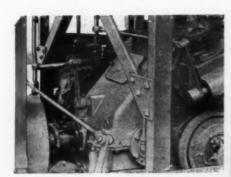


"When You've Got To Fight Time On A Pipe-Line Job,



Do It With A PARSONS,"

Say Contractors who speak from EXPERIENCE



Close-up of Parsons main machinery, showing the single case that houses all driving gears—an important engineering advantage that is reflected in increased ability to stand the gaff.

HISTORY has been made in the oil country this last year—Digging History. Contractors have discovered it's next to impossible to find stuff that they can't dig with Parsons.

stuff that they can't dig with Parsons. Not so long ago, engineers shook their heads over such jobs. "Nothing doing for machines. Tear 'em to pieces." But pipe-line contractors had to have the speed that only machine-digging could give. The Parsons 31 was designed to handle such work and in one short year it has blazed a new trail for trenchers.

Where other machines had turned up their noses, the Parsons 31 put its nose down—and dug. Through tight places where ordinary diggers would have been helpless, the offset design of the Parsons enabled it to dig right ahead. Through rocky ground where ordinary diggers would have called for Time Out, the Parsons 31 dug job after job, sometimes working double shifts for weeks at a stretch. No won-

der pipe-line contractors say, "When you must fight Time, do it with a Parsons."

Parsons."

Parsons builds a complete line of three offset ditchers—the 21, the 25 and the 31, for trench up to 48 inches wide and 12 feet deep—plus the Parsons 40 for extra heavy work—plus a high-speed backfiller. All of them have helped to build the Parsons reputation for handling more dirt per dollar. And all of them will live up to it on your jobs.

The
Parsons
Company
Newton, Iowa
Division of National
Equipment Corporation



PARSONS

A complete line of trenchers and backfillers



One of the Highway Service Trailer Spreaders

mounted on an Autocar truck, a Model 25 reversible blade snow plow and a Model 16-B light-weight reversible blade snow plow for attaching to trucks of from 1 to 2-ton capacity. Members of the company in attendance will be Earle S. Philips, Vice Pres. and Gen. Mgr.; R. S. Tucker, Asst. Mgr.; W. D. Polk, Sales Engr. and Asst. Secy.; C. G. A. Schmidt, Jr., Chief Engr.; J. W. Kitts, Adv. Mgr.; G. C. Abbe, E. C. Brown, F. H. Greaney, L. E. Walker, E. A. Konzelman, W. G. Harrington, R. P. McCormick, M. A. King, John Bishop, F. H. Wunder, H. G. Fassitt, E. D. Clapp, F. J. Pratt and William Bryant, District Mgrs. and Sales Reps.

Harnischfeger Sales Corp., Milwaukee, Wis., will exhibit in Space 317 three complete excavators, a standard Model 300-A dragline excavator, a new Model 600-A diesel shovel, a Model 35 backfiller, and a complete travel base with gears and tractions of the new Model 700-A.

Hastings Pavement Co., 25 Broad St., New York, will have as its exhibit a description of its line of products which include compressed asphalt paving and flooring blocks for the wearing surface of streets, roads, piers and bridges. The booth will occupy Space 644.

Hayward Co., 50 Church St., New York, will be located in Space 324 on the main floor and will exhibit Hayward digging and rehandling clamshell, orange peel and dragline buckets. H. C. Ryder will be in charge.

Heltzel Steel Form & Iron Co., Warren, Ohio, will include in its exhibit a Heltzel trailer weighing Agrabatcher plant, a new Heltzel cement weighing Agrabatcher, the standard line of Heltzel steel form equipment consisting of armor plate steel road forms, curb-and-gutter forms, steel forms for constructing sidewalks and straight and battered curbs and steel bin equipment.

Hercules Motors Corp., Canton, Ohio, will exhibit its engines and power units adaptable for use with road building and maintenance equipment, including Models OOC, G and TXO 4-cylinder power units, equipped with clutch power take-off; an OX 4-cylinder power unit with reduction gears and a 6-cylinder YXC power unit, with clutch power take-off; OOC, OX, L and TX 4-cylinder engines; WXC and YXC 6-cylinder engines and various parts for the OO, TX and YX series. The exhibit which will be located in Space 234 will be in charge of Charles P. Weekes, Eastern Sales Representative with Charles Balough, John C. Keplinger, D. W. Latta, C. R. Schuler, Walter Radtke, R. J. Scott, George Belden, Gus Wehling and John Carnahan in attendance.

Highway Service, Inc., 11-15 North Sixth St., New Bedford, Mass., will have on display in Space 157 on the main floor two models of the Highway trailer spreaders and a working model of a large unit.

Highway Trailer Co., Edgerton, Wis., will exhibit the Highway trailer scraper and a 4-wheel drop frame side-dump trailer.

Huber Manufacturing Co., Marion, Ohio, will have on display a 10-ton and a 5-ton 4-cylinder motor roller, both of which will be equipped with new improved scarifiers. M. E. Miller, Sales Director, will be in charge.

Hug Co., Highland, Ill., will exhibit a complete line of Hug road building trucks, among which will be Model 60, Model 87M and Model 97 which will be exhibited for the first time, as well as a Hug subgrading machine.

Hughes-Keenan Co., Mansfield, Ohio, will exhibit for the first time in Space 111 a mechanical power hoist for Ford and Chevrolet trucks, which will be shown combined with a Hughes-Keenan dump body. Other exhibits will be a



A Hughes-Keenan Iron Mule

4-yard Iron Mule and a Roustabout crane, both mounted on a McCormick - Deering Model 20 tractor, and a quiek - acting hand hoist designed for a Ford truck. In addition, a 2-yard Iron Mule and a Roustabout erane mounted on a United tractor will be exhibited at the booth of the

United Tractor & Equipment Corp. Arthur Hughes, Pres., W. E. Post, J. D. Corrigan, A. T. Reynolds, W. L. Poffinberger and Herman Schaller will be in daily attendance.

Hyatt Roller Bearing Co., Harrison, N. J., will exhibit Hyatt bearings of every size and type suitable for every kind of construction equipment application.

Indiana Truck Corp., Marion, Ind., and the Brockway Motor Truck Corp., Cortland, N. Y., will exhibit four models of Brockway-Indiana Road Builders. This exhibit will be located in Space 153 on the main floor, with H. K. York, Vice Pres., Indiana Truck Corp., in charge, assisted by A. G. Price, Marion F. Hart, E. B. Sinclair, Hoyte Summerland, C. B. Summerland, O. C. Dunham, P. E. Muhlbach, P. H. Livengood and F. J. Fowler.

Industrial Brownhoist Corp., Cleveland, Ohio, will have on exhibition a 1930 Model CC crawler shovel crane and a new model of Industrial Brownhoist ditching machine.

Insley Manufacturing Co., Indianapolis, Ind., will display a Type C Insley skimmer and a Type R shovel. The exhibit will be located on the stage, along with those of the other members of the National Equipment Corp.

International Harvester Co. of America, Inc., 606 South Michigan Ave., Chicago, Ill., will exhibit a heavy-duty International truck with a 3-yard dump body, an International 6-speed special with a 1½-yard dump body and cutaway chassis, a Model 20 and a 15-30 McCormick-

The New MASTER I BOUGHT MY THIRD RANSOME MY RANSOME HAS I THOUGHT IT .

BEEN IN OPERATION SIX YEARS AND IS STILL OKey WAS THE STURDI-EST MACHINE ON THE MARKET



EVERY UNIT EASY TO GET AT!

HERE IS A PAVER I WANT SEE THAT SUPPORTING FRAME

SOME IDEA THAT **GEAR BOX**









A FLEXIBLE COUPLING BETWEEN ENGINE AND GEAR BOX





THAT VALVE DOES'NT-BY-PASS-THE TANK IS **ALWAYS** ACCURATE

SEE THAT ONE PIECE MAIN FRAME



the Ransome BOOTH at the ROAD SHO Nº 218

> Ransome Concrete Machinery Company 1850-Service for 80 Years-1930

Dunellen

New Jersey

Deering industrial tractor and Models 200 and 300 McCormick-Deering power units. Among the company's representatives at the exhibit will be W. F. McAfee, G. B. Abbott, P. Y. Timmons, W. M. Parrish, and H. P. Thieman.

Knickerbocker Co., Jackson, Mich., will have Space 333 on the main floor to the right of the stage. There will be exhibited a Knickerbocker 14-S concrete mixer, a 3½-S tilter and a model for demonstration of the new Knickerbocker Materialift. W. B. Knickerbocker, Pres., and W. W. DuPre, Vice Pres. and Sales Mgr., will be in attendance.

Koehring Co., Milwaukee, Wis., will display for the first time the new Koehring Dumptor, and a new 401 shovel-crane-dragline. Other equipment exhibited will be a Koehring 27-E paver, 601 heavy-duty shovel and 301 heavy-duty crane. This exhibit will be located in Space 340 on the stage of the auditorium.

Kohler Co., Kohler, Wis., will exhibit a Model EH 1½-kw 110-volt D. C. Kohler electric plant, a No. 5A1 5-kw electric plant and two Models D 1½-kw., one a cut-away type electrically operated.



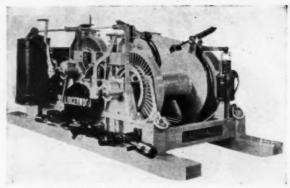
The New Lakewood Tandem Screed

Lakewood Engineering Co., Cleveland, Ohio, will have on display in Space 229 a Lakewood Type C tandem screed finishing machine, shown for the first time, a steel subgrader, a Lakewood power subgrader, also a new unit, a graderooter, Duo-Rail road forms and aluminum straightedge.

LaPlant-Choate Manufacturing Co., Cedar Rapids, Iowa, will exhibit a SV-30 snow plow, a BD-30 bulldozer, a DW-7 hydraulic dump wagon with crawler tracks, a pump stand, tank and so forth and a 3-way dump wagon on tracks, a new product being shown for the first time.

John Lauson Manufacturing Co., New Holstein, Wis., will exhibit in Space 527 its line of horizontal and vertical engines and contractors' equipment, consisting of diaphragm and centrifugal pumps. There will be three sizes of horizontal engines on display, 2, 3 and 3½-horsepower, and both air cooled and radiator cooled vertical engines as well as a single diaphragm unit and a double 3-inch diaphragm pump. F. H. Edson, Pres., will be in charge, assisted by E. N. Klein and W. J. Whatley.

Leach Co., Oshkosh, Wis., will exhibit a 3½S tilter, a plaster mixer, a 5S non-tilter, a 7S non-tilter and a 10S non-tilter.



The New Steel Erector's Safety Hoist

Lidgerwood Manufacturing Co., 775 Lidgerwood Ave., Elizabeth, N. J., will exhibit a Tugmore electric capstan, a Utility hoist and the new high speed hoist with automatic brakes.

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill., will exhibit a 1-cubic yard Type K-30 gasoline shovel in Space 321, Section C, on the main floor. G. H. Olson, A. Eilersgaard, N. A. Weston and other members of the organization will be in attendance.

Linn Manufacturing Corp., Morris, N. Y., a subsidiary of the La France-Republic Corp., will exhibit a Linn tractor with standard body equipment in Section B, Space 206. Those in attendance will be G. R. Hanks, Pres.; P. W. Gould, Gen. Sales Mgr.; E. W. Wheeler, Chief Engr.; H. J. Whitman, Treas.; Walter P. Hanson, Adv. Mgr.; and B. F. Lease, Robert A. Bowler, L. W. Smiley and C. J. Witherstine, Dist. Mgrs.

Littleford Bros., Cincinnati, Ohio, will occupy Booth 507-521 with L. W. Glaser in charge. The exhibit will include the new high speed maintenance kettle and the advanced motor-driven spraying attachment for penetration and skin patching, shoulder work, widening of curves and crack filling as well as a No. 84-WS oil burning maintenance kettle of 50-75 gallon capacity, a No. 98 LB surface heater, an all-steel heavy-duty tool box, a small stationary tool box, an LB Trail-O-Heater and the new Universal concrete heater attachment.



A Littleford Heavy-Duty Tool Box

Lufkin Rule Co., Saginaw, Mich., will exhibit as heretofore its complete line of steel and woven measuring tapes, and aluminum, boxwood, spring joint and steel rules for highway engineering construction and maintenance work.

M & M Wire Clamp Co., 983 17th Ave., S.E., Minneapolis, Minn., will exhibit for the first time a new metal wall-studding with clamps and spacers in addition to its regular line of M & M wire clamps, column, splicing and tie rod clamps, invisible and strip ties, sheeting darts, adjustable and timber shores, targets, screed gages, wire cutters, nippers and trench braces. The booth will occupy Space 624, with H. O. McMillan, Pres., in charge.

Always Primed

In work on the lower level of the Grand Central Terminal, New York City, a group of LaBour Pumps operated by the Thos. Crimmons Co. have received enthusiastic endorsement from the railroad company's engineer in charge. One of these pumps (shown above) is kept operating continuously on an intermittant inflow against a suction lift of 22 feet through 100 feet of three-inch hose. This is typical of LaBour service to industry—a service that has been founded upon LaBour performance, economy and adaptability to almost every type of water moving operation. LaBour Centrifugal Pumps use no floats, valves or auxiliary priming apparatus. Wherever water must be moved-whether the inflow is continuous or intermittant—this feature of LaBour design provides operating characteristics such as other pumps cannot offer.

Write for Bulletin

THE LABOUR COMPANY, INC.

LABOUR

OUR PUMPS NEVER LAY DOWN ON THE JOB

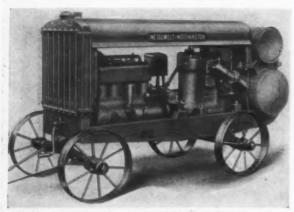
Manitowoc Engineering Works, Manitowoc, Wis., will fexhibit in Space 319 the latest type of Moore Speederane and Moore Speedshovel, in both of which are included several new improvements.

A. S. Marlow, Ridgewood, N. J., will exhibit a new 4-inch self-priming centrifugal pump, an electrically driven 3-inch centrifugal pump, a 4-inch engine-driven, ball valve type double plunger force pump, a 3-inch single Mud Hog diaphragm force pump, a 3-inch single Water Hog open discharge diaphragm pump and a 6-inch engine driven centrifugal pump.

McKiernan-Terry Corp., 19 Park Row, New York, will have Space 429 and will exhibit there a small McKiernan-Terry pile hammer, a 15-horsepower double-drum National gasoline hoist, and a 35-horsepower double drum National gasoline hoist and will show moving pictures of McKiernan-Terry pile hammers and Steele & Condict bridge machinery in operation.

Mead-Morrison Manufacturing Co., Prescott & Orleans Sts., East Boston, Mass., will exhibit a 1930 model Giant Half-Yard shovel, with attachment such as a 35-foot crane with a ½-yard M.S.D. clamshell bucket, and a complete line of motor truck winches, featuring the Multi-Speed power reverse winches. The booth will be in Space 208.

W. R. Meadows, Inc., Elgin, Ill., will have on exhibition a full line of Sealtight expansion and asphaltic joints in Booth 553, with J. E. H. Brown, Vice Pres., in charge.



A Metalweld-Worthington 110-Cubic Foot Compressor

Metalweld, Inc., 26th & Hunting Park Ave., Philadelphia, Pa., will have on display a 330-cubic foot Towabout compressor and a working cut open section of the 110-cubic foot Towabout model compressor to show the working parts of the unit. This exhibit will be located in Space 301 on the main floor.

Montgomery & Co., Inc., 292-4-6 Lafayette St., New York, will exhibit its line of Starrett steel band and cable cutters.

Moritz-Bennett Corp., Effingham, Ill., successors to the Highway Shoulder Machine Co., will exhibit in Space 419 a new model of the Moritz shoulder and berm finishing machine which has a number of new improvements. There will also be motion pictures of the machine in operation.

Morris Machine Works, Baldwinsville, N. Y., will have on display a model of a sand and gravel dredge with a traveling screen on the suction. The pump in the unit will be of the Morris heavy duty lined type designed for such service. Those representing the company will be V. J. Milkowski, F. S. Salchenberger and A. H. Young.

Morse Chain Co., Ithaca, N. Y., will display the Morse silent chain drive as well as the flexible coupling, single, double and triple speed reducers and the ring and discoilers. J. A. Meany, E. R. Morse, A. B. Wray, R. J. Koch, F. G. Anderson and Messrs. Kearney, Hoffman, Phillips and Bertram will be in attendance while Norman Bremer will have charge of the installation of the mechanical devices and will supervise their operation during the show.

National Brake & Electric Co., Milwaukee, Wis., with the Milwaukee Locomotive Manufacturing Co., Milwaukee, Wis., will occupy Booth 457 and will have on exhibition there the National line of portable engine driven compound air compressors in sizes of from 110 to 330-cubic foot displacement as well as a standard Milwaukee Type H-8 8-ton 36-inch gage gasoline locomotive. P. L. Critenden, Vice Pres. and Gen. Mgr.; F. B. Peterson, A. M. Poole, W. L. Berghoefer and J. S. Franco of Milwaukee and O. S. Compton of Philadelphia will be in attendance.

National Paving Brick Manufacturers Assn., National Press Bldg., Washington, D. C., will exhibit a model of brick pavement construction, samples of paving brick, literature and a motion picture of construction operations at Booth 545-551. G. F. Schlesinger, Chief Engr. and Managing Director, and William C. Perkins, Consulting Engr., will be in attendance.

National Steel Pabric Co., Union Trust Bldg., Pittsburgh, Pa., will exhibit in Booth 126 on the main floor its latest developments in electrically welded reinforcement for concrete roads and pavements in center line construction. The exhibit will be in charge of W. L. Whitman, Philadelphia District Mgr., and H. D. Beaton, H. H. Robinson, H. D. Stone, G. D. Haddow, W. S. Edge and R. L. Glose.

Nordberg Manufacturing Co., Milwaukee, Wis., will have on display a 4-foot Symons cone crusher mounted on a steel skid and driven by a 50-horsepower motor. Those representing this company will be W. M. Symons, L. D. Hudson, J. M. Thistlewaite, A. C. Colby, A. Mellor and Delbert Kay.

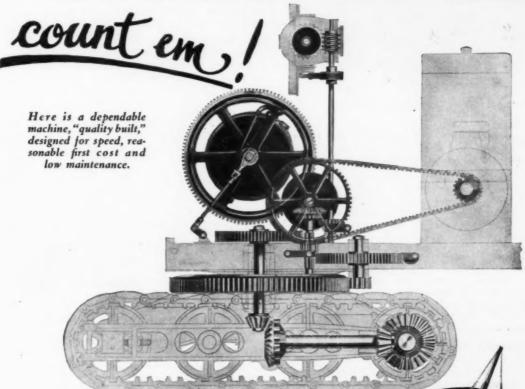
Ohio Power Shovel Co., Lima, Ohio, will exhibit in Space 305 a complete Lima 101 gasoline shovel and a lower frame complete assembly to show construction parts. All district managers and salesmen will be in attendance.

O. K. Clutch & Machinery Co., Columbia, Pa., will exhibit its line of air compressors and hoists and the O-K portable elevator.

Orton Crane & Shovel Co., 608 So. Dearborn St., Chicago, Ill., will exhibit an Orton 5%-yard convertible shovel powered with a 6-cylinder engine. Members of the company who will be in attendance at Space 308 in the main auditorium will be P. A. Orton, Jr., Vice Pres. and Sales Mgr.; A. R. Whitney, S. R. Vanderbeck, H. W. Hegeman, John M. Connell, A. H. Krigger, B. L. Whitney, W. D. Tulley, Stuart S. Smith, Leigh M. Railsback, Alex Orton and F. D. Small.

Page Steel & Wire Co., Bridgeport, Conn., and the American Cable Co., will have on display in Space 315 a Hi-Way guard, cables such as those used on various big bridges, Crescent and Trulay rope, wire rope fittings, Trulox fittings and assemblies.

Only Sixteen Gears in the Entire Gear Train-



THE selective gear shift patented and used exclusively on Moore Speedcranes "Made in Manitowoc" is the basis of simplicity. No square jaw clutches, no cumbersome gear arrangements, no needless friction; all travel and boom hoist gears encased and running in oil. The entire mechanism is radically simplified — so accessible that any part, and they are of oversize dimension, may be removed without disturbing other parts.

The sixteen gear arrangement is but one of many reasons WHY the Moore Speedcrane, Shovel, Trenchoe, and Dragline is so popular. Repeat orders indelibly prove this. Investigate — then let the outcome form your opinion.

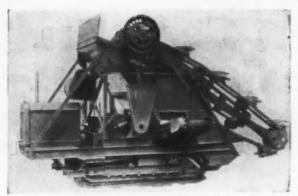


MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

(Sole Licensee to manufacture and sell Moore Speedcrames and Shovels)
Chicago Agents: MOORE SPEEDCRANE CO., 2916 W. 26th Street
Eastern Sales Agents: FORSYTHE BROS., 30 Church Street, New York, N. Y.



Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.



The Parsons 25 Ditcher, Adaptable to Medium-Sized Jobs

Parsons Co., Newton, Iowa, will exhibit the 1930 model of the Parsons 25 trench machine. The exhibit will be located on the stage with the other members of the National Equipment Corp. group.

Pioneer Gravel Equipment Manufacturing Co., 1515 Central Ave., N.E., Minneapolis, Minn., will have on display a miniature Pioneer screening, crushing and loading plant which will be in actual operation and crush rock. This exhibit will be located in Space 512.

Prest-O-Lite Co., Inc., 30 East 42nd St., New York, will have on exhibition a full line of Prest-O-Lite truck and tractor lighting equipment and carbic floodlights, Prest-O-Lite small tank appliances, Oxweld cutting and welding equipment and the carbic generator. The booth will in Space 406 with H. H. Griffith of the New York office in charge.

Ransome Concrete Machinery Co., Dunellen, N. J., will occupy Booth 218. The major equipment to be displayed will be the new Master 27-E paver, the 1930 model of the 28-S standard building mixer and the 1930 model of the 7-S standard building mixer. Among the Ransome representatives in attendance will be George C. Ellis, Pres.; A. P. Robinson, Sales Mgr.; H. C. Peters, Mid-West Mgr.; O. L. Dent, Pacific Coast Mgr.; and Arthur W. Wilson, Adv. Mgr.

Ray-Signs Corp., Nicoll & Canner Sts., New Haven, Conn., will exhibit a variety of reflecting signs and devices known as Rayflectors which are used in the highway construction and lighting field.

Relay Motors Corp., Lima, Ohio, will show for the first time the new Model 50D Relay truck, equipped with a 3-yard dump body and hoist. The Relay Model S11 equipped with a 1½-yard gravity dump body will also be on display in Space 528. W. E. Murphy will be in charge of the exhibit, assisted by the company's eastern representatives.



A Republic Non-Tilting Mixer

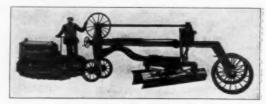
Republic Iron Works, Tecumseh, Mich., will display its newer and later models of tilting and nontilting mixers in the Exhibition Hall below the main floor.

W. A. Riddell Co., Bucyrus, Ohio, will exhibit its complete line of road machinery, including Model E and ER graders, Model 10R and 15 Road Hogs, the new Model T 2-yard wheeled scoop and the new drawn or pull type grader. This exhibit, which will occupy Space 155 on the main floor, will be in charge of N. E. Jersey, Mgr., Road Machinery Sales.

Rogers Brothers Corp., Albion, Pa., will exhibit three trailers, a multi-wheel trailer with 12 wheels on rocking axles, a 35-ton unit and a girder type trailer. Charles Rogers, Pres., will be in charge.

Rome Manufacturing Co., Rome, N. Y., will exhibit in Space 669-672 the line of Rome graders, including drawn and scarifler graders, quick hitch graders, motor graders in both the wheel and crawler types and motor grader attachments for Model 20 Cletrae tractors and Twin City 17-28 tractors. E. C. Gledhill will be in charge.

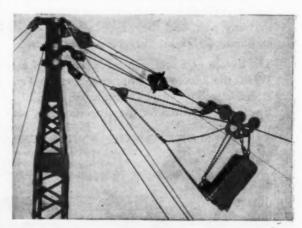
Root Spring Scraper Co., Kalamazoo, Mich., will show the Root hydraulic truck scraper with a recently developed improvement, a Big Buster V snow plow equipped with clip wing and the long hydraulic operated wing, and the straight blade plows and V plows for light 1-ton trucks and passenger cars. This exhibit will be in Space 529, with E. A. Weeks, Sales Mgr., in charge.



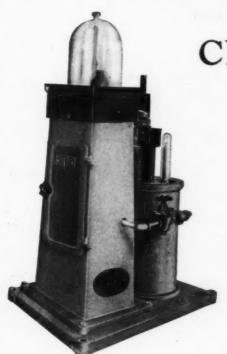
A Ryan Economy Grader with Dual Blades

Ryan Manufacturing Corp., 13501 Baltimore Ave., Chicago, Ill., will exhibit in Space 668-673 a latest model Ryan motor controlled grader and a pull type one-man maintenance grader with dual blades. R. D. Bartlett, Vice Pres.; O. Q. Hinds, Secy. & Treas.; G. J. Oie and L. B. Sherman, District Sales Mgrs., will be in attendance.

Sauerman Bros., 438 So. Clinton St., Chicago, Ill., will exhibit the 1930 model of the Sauerman slackline cableway, a power drag scraper, a Crescent scraper bucket and a number of Durolite blocks with sheaves in Spaces 537 and 539 with R. H. Baughman in charge, assisted by J. A. Schultz, W. F. Bartholomae, J. L. Nellis and G. E. Gates.



Top of Steel Mast of Sauerman Slackline Cableway Excavator, Showing Use of Swivel Bands for Attaching Lower Guide Blocks to Mast and Swivel Plate for Attaching Guy Cables



Solution Feed CHLORINATORS

30% MORE EFFICIENT

at New Haven

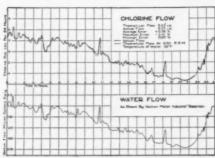


Diagram showing accuracy of W&T Automatic Vacuum Type A S V Solution Feed Chlorinator at Malthy No. 1, New Haven Water Company.

Note: The flow of chlorine varies exactly with the flow of water

NEW HAVEN—with its enviable record for safe water and freedom from typhoid fever—has just announced a finding of first importance to water works and health officials. (See page 477 Water Works Engineering, Vol. 82, No. 8.)

MANAGER TANDARIAN TA

Based on several years experience with chlorination by both solution and direct feed methods of application, they find:

SOLUTION FEED \ 37.2\% more efficient at Lake Dawson 27.6\% more efficient at Maltby No. 1

The higher efficiency of solution feed chlorination over direct feed chlorination as proven at New Haven holds wherever chlorine is used—whether for water sterilization, sewage disinfection, swimming pool sanitation, odor control, or for industrial uses.

In many plants the savings in chlorine alone—to say nothing of the maintenance savings and ease of operation—will pay for a duplicate Chlorinator.

And W&T Solution Feed Chlorinators make use of the vacuum principle of control—that insures long life and rugged dependability.

WRITE FOR TECHNICAL PUBLICATION No. 99

"The only safe water is a sterilized water"



WALLACE & TIERNAN

COMPANY, INCORPORATED

Manufacturers of Chlorine Control Apparatus

NEWARK

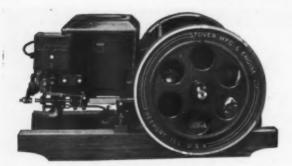
NEW JERSEY



NEW YORK CHICAGO KNOXVILLE SAN FRANCISCO MINNEAPOLIS PITTSBURGH DALLAS KANSAS CITY
LOS ANGELES SEATTLE ST. LOUIS BUFFALO INDIANAPOLIS DETROIT BOSTON JACKSONVILLE
CHATTANOOGA CHARLOTTE OKLAHOMA CITY PHILADELPHIA SPOKANE DEDEN
WALLACE & TIERNAN, LTD., TORONTO, CANADA WALLACE & TIERNAN, LTD., LONDON, ENGLAND

24.15

THE THE THEOREM DESCRIPTION OF THE PROPERTY OF



A Stover Horizontal Industrial Engine

Schramm, Inc., West Chester, Pa., will exhibit a Schramm multi-eylinder No. 120 air compressor and a No. 360-cubic foot compressor.

The Servicised Products Corp., 53 W. Jackson Blvd., Chicago, Ill., will have an exhibit of premolded bituminous construction materials, including new forms of expansion joint fillers, pressure molded from fibrated asphalt; protection course planking; asphalt planking for bridges; rail filler and track insulation; molded trunking and capping; tunnel and embankment liners; sewer pipe calking materials and roofing speciaties. The exhibit will be in Space 608-A.

Shunk Manufacturing Co., Bucyrus, Ohio, will exhibit the line of Shunk products, including road, drag and wheeled scraper blades for all makes of road machinery, rooter and scarifier teeth, snow plow blades, moldboards and grader structurals. This exhibit, located in Space 561 in the basement, will be in charge of C. H. Richardson and G. H. Fegley.

Smith Engineering Works, Capitol Drive at Holton St., Milwaukee, Wis., will exhibit model rock crushing and gravel washing plants, the latter including the new Telsmith acrew rewasher for sand recovery.

Smith Trailer Corp., Syracuse, N. Y., will display a Model 85 Smith all-steel bottom dump semi-trailer in Space 667. R. Shaw Goldthwait will be in charge.

T. L. Smith Co., Milwaukee, Wis., will have on display a new 1930 model 27-E paver, the new 84-S 3-yard Smith tilting mixer with Weigh-Mix equipment, a 2-bag 10-S non-tilt mixer, a 3½-S tilter, a 3½-S and a 5-S Kwik-Mix concrete mixer and a 5-PM plaster and mortar mixer.

Solvay Sales Corp., 40 Rector St., New York, will feature the use of Solvay calcium chloride for concrete construction, dustlaying and ice removal. The booth will be located in Space 331, with G. P. Spencer in charge.

South Bend Lathe Works, South Bend, Ind., will exhibit four new model screw cutting precision engine lathes and will demonstrate two of them on typical road builders' problems.

Speeder Machinery Corp., Cedar Rapids, Iowa, will have in Space 312, located directly in front of the stage, an unannounced exhibit of interest in the power shovel field, as well as an exhibit of its B-3 ½-yard shovel with several improvements. Those in attendance will be T. M. Deal, Sales Mgr.; H. W. Parsons, Asst. Sales Mgr.; Edgar McNall, Adv. Mgr.; L. A. Bartlett, Dist. Sales Mgr.; B. W. Olin, W. H. Boyd, District Mgrs., and H. J. Parcell.

Sterling Motor Truck Co., Milwaukee, Wis., will show a new 4-wheel drive Model EWS36-AB 10 to 12-ton truck, a Model DC23 light weight heavy duty chain drive 5½ to 7-ton truck, and a Sterling DW13 worm gear drive, 3 to 4-ton truck.

Stover Manufacturing & Engine Co., Freeport, Ill., will feature the Stover vertical-type power units, in single, double and four-cylinder types, with both hopper and radiator-cooling systems. The new and refined horizontal-type completely enclosed Stover engine of the C T type will also be exhibited. Lee Madden, Vice Pres. in charge of Sales, will be in charge of the exhibit.

A. Streich & Bro. Co., Oshkosh, Wis., will have on exhibition a 6-yard dump wagon trailer, a pair of track laying wheels and a flexible tractor hitch. The exhibit will be located in Space 422, with Fred Streich in charge.

Thew Shovel Co., Lorain, Ohio, will show for the first time the new Lorain 75-B in addition to the ¾-yard Lorain-45 and the 1-yard Lorain-55, which will also be exhibited. For the Universal Crane Co., there will be a Universal-35 backdigger and a 7½-ton capacity motor truck mounted crane, equipped with a Christie crawler attachment.

Timken Roller Bearing Co., Canton, Ohio, will occupy Space 327. Its exhibit will consist of an assortment of bearings of types suitable for use in road building and maintenance equipment. Those in attendance will be L. M. Klinedinst, G. D. Thewlis, R. W. Ballentine, W. P. White, J. W. Weir, W. B. Moore, J. H. Beach, S. C. Merrill and F. B. Yates.

Toledo Pressed Steel Co., Toledo, Ohio, will exhibit in addition to its regular line of Toledo torches, a new collapsible pressed steel horse in eight different sizes, ranging from 18 to 60 inches in height.

Trackson Co., 500 Clinton St., Milwaukee, Wis., will display for the first time four new machines, the Trackson crawler for the 15-30 McCormick-Deering tractor, Trackson crawler wheels, a Trackson hoist and the new shovel. In addition to these new machines, there will also be exhibited several Model L Tracksons, a Model DH Trackson McCormick-Deering equipped with a Trackson bull-dozer, a crane mounted on a McCormick-Deering wheel tractor and several other pieces of Trackson equipment. The exhibit will occupy Space 102 on the main floor, with L. E. Dauer, Sales Mgr., in charge, and W. E. Stiemke, Vice Pres. and Gen. Mgr., R. D. Houghton, R. G. Brunner, J. L. Hawes and several other representatives in attendance.

Transit Mixers, Inc., Call Bldg., San Francisco, Calif., will exhibit three models of Paris Transit mixers. The booth, in charge of Edwin F. Hill, Jr., Sales Mgr., will be located in Space 652.



A New Model Paris Transit Mixer

WELDED STEEL FABRIC, JOINTS, FORMS AND CURB BARS



Insure Rapid and Accurate Modern Road Construction

WELDED STEEL FABRIC
AIR CUSHION EXPANSION JOINTS
DOWEL CONTRACTION JOINTS
REINFORCING RODS
ROAD FORMS—CURB BARS



The development of Truscon Products has kept pace with the great advances in modern concrete road construction. Truscon Welded Steel Fabric is an ideal mesh reinforcement which is easily installed and stays where it is placed. Truscon Dowel Contraction Joints provide definite planes for expansion and interlock the adjoining slabs. Truscon Air-Cushion Expansion-Joints are 100% efficient, allowing the joints to close completely when the pavement expands. Truscon Road Forms insure rapid and accurate construction. Truscon Curb Bars reinforce and protect concrete curbs against shocks and abrasion.

Handbook on Modern Road Construction sent free on request

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO HIGHWAY DIVISION

TRUSCON STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONTARIO
Warehouses and Offices in Principal Cities

Do you mention the Contractors and Engineers Monthly when writing? Please do.

Trucktor Corp., 156 Wilson Ave., Newark, N. J., will exhibit its line of Trucktors in a variety of types and sizes for use with trucks.

Twin Disc Clutch Co., Racine, Wis., will exhibit its line of power take-off units and clutches suitable for use in road building and industrial machines. G. M. Guilbert, Sales Mgr., will be in charge of the exhibit.

Universal Crusher Co., Cedar Rapids, Iowa, will have Space 304 near the stage in the main hall. There will be on display a 5 x 6 Universal crusher, a 6 x 16 steel crusher, an 8 x 36 steel crusher for oversize gravel, a running model of the 8 x 36 crusher of one-fourth size, a 15 x 36 portable crusher on a roller bearing truck with folding elevator and a 5 x 48 steel crusher, shown for the first time. Those in attendance will be W. L. Harrison, Gen. Mgr.; L. W. Dunlap, Sales Mgr.; F. L. Shramek, Supt.; R. D. Conway, Designing and Service Engr., and F. A. Velde and W. W. Simmons, Salesmen.

Wallace & Tiernan Co., Newark, N. J., will exhibit a W & T standard one-way flasher, a Universal flasher, a one-way railroad flasher, an octagonal stop street flasher, a Universal over-head flasher, a Universal marine flasher and a sunshine switch demonstrating unit. An outstanding feature will be a demonstration of the internal mechanism of W & T various types dry battery operated flashers.

Walter Motor Truck Co., Inc., Queens Blvd. at 37th St., Long Island City, N. Y., will exhibit the Walter Snow Fighter with an offset V front plow.

Warren-Knight Co., 136 North 12th St., Philadelphia, Pa., will exhibit in Booth 546 the complete line of Sterling transits and levels, including the two new models, Sterling light surveyors' transit No. 26 and the light contractors' transit No. 28.



Heating Westphalt on the Job

West Process Pavement Co., 1439 Starks Bldg., Louisville, Ky., will have an interesting display of Westphalt, an asphaltic paving material. Those in attendance will be W. C. West, Pres.; C. R. Hawley and R. E. Walters, Dist. Mgrs.; and A. E. Ryan, Technologist.

Western Wheeled Scraper Co., Aurora, Ill., will have on display its latest development in crawler dump wagons, which have a direct tractor hitch and carry the load on Athey Truss wheels of the crawler type.

Wheeling Mold & Foundry Co., Wheeling, West Va., will have on display a 9 x 36 and a 15 x 38 roller bearing crusher. This exhibit will be located in Space 414, with W. H. Sallwasser, Mgr., Crusher Dept., in charge.

The White Co., 842 E. 79th St., Cleveland, Ohio, will exhibit in Space 144 a White Model 58 heavy duty dump truck, a 61 dump truck, and a Model 59 heavy duty chassis. Those in attendance will be Robert W. Woodruff, Pres.; Saunders Jones, Vice Pres. and Asst. to Pres.; W. A. Maynard, H. P. Starbird, R. W. Knowles, J. M. Bauman, C. I. Fraley, G. R. Gwynne, R. J. Logan, R. Lapham and R. E. Laisy.



A Wiard Grade-Ripper

Wiard Plow Co., Batavia, N. Y., will exhibit three new Wiard products, including the Wiard Grade-Ripper which is a scarifier or gang rooter, the new Wiard automatic revolving scraper and the complete line of Wiard road and contractors' plows. Ray Wiard, Pres., and S. J. Hunt, Sales Mgr., will be in attendance.

Willett Manufacturing Co., Grand Rapids, Mich., will exhibit in Space 409 the new 1930 model Willett spring scraper mounted on an International truck.

G. H. Williams Co., Erie, Pa, has been assigned Space 459 where will be exhibited the new Williams arch-girder trailer, the new Champion excavator bucket and improvements on the Williams double-arch dragline bucket.

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo., will exhibit in Space 540 a Jumbo junior crusher, a reject crusher, parts of the new ring type gravel crusher and an operating model of the new Non-Clog crusher which crushes wet or muddy stone without choking. Ray F. Schneider will be in charge.



One of the Wheeling Roller Bearing Crushers

No need to wait YEARS for this year's NEEDS

IF your 1930 budget seems hopelessly small for all it must accomplish during the year—

And ridiculously inadequate in view of future improvements needed—

Acquaint yourself with Tarvia "Re-Tread".

No other type of pavement can be built so quickly and cheaply, or with so little road-building equipment. The cost is so low that there is no longer any reason for dusty, rough or dangerous surfaces on light-traffic roads. Yet Tarvia "Re-Tread" will stand a surprisingly large amount of traffic.

The Tarvia field man will gladly give you the details. Phone' write or wire our nearest office.



= The Gazett Company =

New York St. Louis Detroit Buffalo Providence Chicago Baltimore Lebanon Minneapolis Cleveland Philadelphia Syracuse Toledo Youngstown Boston Birmingham Columbus Milwaukee Cincinnati Rochester

In Canada: The Barrett Company, Ltd., Montreal, Toronto, Winnipeg, Vancouver

W-K-M Co., Inc., Houston, Texas, will exhibit in Space 328 a W-K-M side boom unit, Models Thirty and Sixty, and a jaw crusher.

Alan Wood Steel Co., Conshohocken, Pa., will display AW traffic treads for wooden floor bridges and Diamondette floor plates for equipment, platforms, running boards and foot boards.

Wyoming Shovel Works, Wyoming, Pa., will exhibit Red Edge shovels, scoops and picks.

Young Radiator Co., Racine, Wis., will exhibit a number of new pieces of equipment, including diesel engine radiators and gas engine power unit equipment. The exhibit will be located in Space 504 and those in attendance will be F. M. Young, Pres.; J. J. Hilt, Sales Mgr.; W. L. Walton, Sales Engr., and D. A. Hisey, Supt.

Zenith-Detroit Corp., Detroit, Mich., will exhibit in Space 502 a complete new series of heavy duty carburetors, the 90 series, for industrial equipment.

Allis-Chalmers Mfg. Co., Monarch Tractors Div., Springfield, Ill., will show a Model 75, a Model 50, a cut-away Model 50, and the Model 35 which was announced at last year's show and is now in production, as well as a number of parts and assemblies.

Bucyrus-Eric Co., South Milwaukee, Wis., will exhibit three machines of its complete line, a Gas + Air 1-yard shovel a 1030 3/4-yard gasoline clamshell and dragline and a 1020 1/2-yard gasoline shovel.

Dodge Brothers Corp., Detroit, Mich., will exhibit its line of trucks designed for road building and highway construction, including dump bodies and trucks on which are mounted road scrapers and snow plows.

The General Excavator Co., Marion, Ohio, because of the limited carrying capacity of the floor of the exhibit hall, will show but one machine, a General ½-yard convertible excavator equipped with a shovel boom assembly and powered with a standard make 6-cylinder motor in Booth No. 318 on the main floor of the exhibit hall.

Homelite Corp., Port Chester, N. Y., will show its line of improved portable equipment. W. H. Warren, Vice Pres. and Gen. Mgr., F. G. Eisley, Sales' Dept., and R. McV. Cameron, Engineering Dept., will represent the company.

The Jaeger Machine Co., Columbus, Ohio, will exhibit its 1930 line of Jaeger-Barnes pumps and self-priming centrifugal type pumps. The display will also include standard diaphragm pumps, convertible diaphragms, lift and force pumps, plunger trench pumps and centrifugals, a Jaeger-Barnes Triplex road pump, a Jaeger Timken-equipped 3½ S trailer model tilting mixer, a Speed King non-tilt mixer with detached skip scale, Timken roller thrust hoists and the trail or truck mixer.

Calcium Chloride Cuts Cost of Cold Weather Concrete

A HIGHLY important factor frequently overlooked in the consideration of cold weather concrete problems is the great saving which can be effected through the use of calcium chloride in the mix. Calcium chloride is not to be considered as a substitute for the usual protection afforded concrete by such means as heating of aggregate and the use of tarpaulin and salamanders, but when costs are considered, it should be remembered that when calcium chloride is used, it is not necessary to provide such protection for so long a time as is usually required.

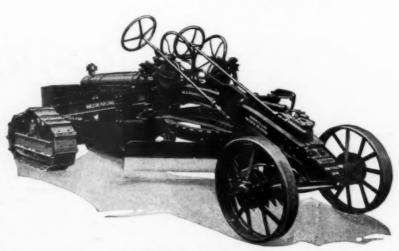
In its book, "Solvay Calcium Chloride in Concrete Construction," the Solvay Sales Corp., 40 Rector Street, New York, states that when it is possible for concrete to gain sufficient strength, which is accomplished through the use of calcium chloride, in one-half the ordinary time, both the cost of protection and the time of greatest hazard are reduced by half. To make certain that these results are obtained, specimens subjected to the same curing conditions as the mass of concrete should be made and tested in the field. This is highly advisable because neglect of the proper precautions in protecting concrete against cold can nullify much of the effort which is made to obtain high strength in concrete by the use of calcium chloride.

An Improved Power Grader

EVERAL new features and improvements have been announced by W. A. Riddell Co., Bucyrus, Ohio, for its Warco Model E power grader. A new circle, of special design, has been put on this model. This circle consists of a one-piece steel casting so constructed that the blade hanger is securely attached to it and the whole firmly mounted in the circle drawbar. The purpose of this is to reduce blade chatter and to give greater stability and easier control to the blade assembly.

The most outstanding feature of this grader is the fact that it can be furnished upon either rubber tired wheels or with Warco rear type crawlers. These mountings are interchangeable on the same axles and can be made in the field in a short time.

Other regular features of the grader which have been retained in this new model are the heavy I-beam construction of the frame, the head-type steering gear, steering like an auto, and enclosed lifting mechanism operating in a bath of grease.



The Warco Model E Power Grader

Models

In addition to the 9 Standard Types supplied during 1929.

Two of the New Models, a 36" gauge "BFA-4" and a 24" gauge "BMD-5" will be displayed at

BOOTH 314 at the

Road Show in Atlantic City

Adhering to Brookville policy the Ford "AA" and McCormick-Deering power units, including transmissions, are retained intact. With the advantages of local service fully retained. Truck and Tractor differentials are merely eliminated in favor of a direct or final drive through the Brookville reversing transmission.

MORE SPEED—TRACTION—POWER

Models "BFA-4" & "BFA-5" supplied with choice of three, four, or six speeds, both forward and reverse.

Models "BMD-4" "BMD-5" and "BMD-6" supplied with four speeds, both forward and reverse.

Steel tired drive wheels, all models, with 25 % more traction, supplied standard, at no extra cost.

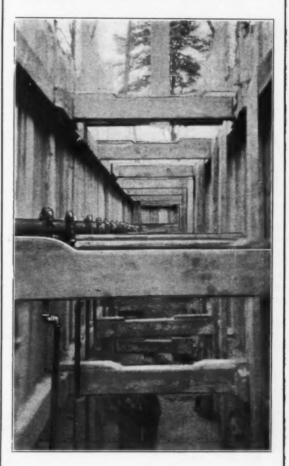
Consult us freely on your haulage problems. Expert advice cheerfully furnished

BROOKVILLE LOCOMOTIVE CO. Brookville, Pa.



MORETRENCH WELLPOINT SYSTEM

"Makes Every Job a Dry Job"

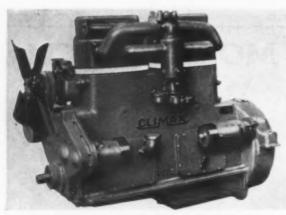


Handling Wet Excavation in the old way is like wasting good time talking about the weather. Why not come to the point at once? The Moretrench Wellpoint for example. Makes "Dry" ones out of "Wet" ones anywhere.

> Inside and Outside Exhibits at the Road Show Atlantic City—January 11-18

MOORE TRENCH MACHINE CO.

Rockaway, New Jersey



A 72-Horsepower 4-Cylinder Blue Streak Engine

A New Series of Heavy Duty Industrial Engines

NEW line of gas, gasoline and distillate burning engines of the heavy duty industrial type has recently been developed by the Climax Engineering Co., Clinton, Iowa. A special feature of these new engines, known as the Blue Streak line, is the combustion system which makes it possible to burn cheaper fuels without excessive sacrifice in power or efficiency.

These engines have a specially designed combustion chamber with overhead valves, large cooling systems and combustion control to give efficiency with corresponding increase in power output for any given displacement. Valving, spark plug location and flame travel are controlled to secure low detonating values. All the engines in this series will deliver 100 pounds or more at normal recommended speeds of 1,000 ppm on gasoline fuel.

The Blue Streak line is available in 4 and 6-cylinder sizes, ranging from 61 to 150 horsepower. Provision is made for the usual ignition, governing and electrical equipment needed for all ordinary requirements and applications.

A Handy and Reliable Lantern

HE National carbide lantern for use in inspection lighting and emergency work is manufactured by the National Carbide Sales Corp., 342 Madison Ave., New York. This lantern burns carbide gas generated from water and National carbide and throws a penetrating far-reaching beam or spreads a diffused light over a wide area as required.

It is self-contained as to water and carbide and is easily portable.

The container at the base of the lamp carries an 8-ounce charge of carbide, enough for 8 hours continuous operation. A supply of water sufficient for the full charge of carbide is carried in the chamber back of the reflector. The burners are readily removed for cleaning or replacement and the water and carbide chambers are accessible for cleaning and filling. A powerful lens of specially made heat-resisting glass is held in place by a strong spring clip. This lens is not affected by heat, water or temperature change.



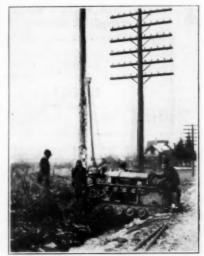
The National Carbide

A safety rear light is provided by a red lens fixed in the back of the lantern. In this way the one flame provides a strong shaft of light in the front and affords protection as a signal in the rear. When attached to a motor car, the lantern is protected from vibration and shocks by a spring bracket. It may be instantly removed from this bracket for hand use as it is provided with a steel wire bail in addition to the fixed steel handle.

Boring the Hole and Setting the Pole

ARTH boring and pole setting equipment making a complete unit for boring holes and setting poles in all kinds of dirt, sand, gravel, shale, hardpan, gumbo or frozen earth, is manufactured by the Highway Trailer Co., Edgerton, Wis. Two men and a Highway earth borer can dig from 75 to 100 holes 7 to 10 feet deep in an ordinary day.

The operation of the boring machine is simple. The action of the auger is controlled by two operating levers located at the side of the boring head where the operator has a clear view of his work at all times. The auger is lowered to a boring position by one lever. By lowering the other lever the auger begins to revolve and bite its way into the ward movement of the lever lifts



earth. The upward movement one of the Highway Trailer Earth Boring
and Pole Setting Machines on the Job

the loaded auger which is discharged of its load of excavated earth as it starts down again. The hole is straight and true and the excavated earth is piled neatly around the hole, a feature which means less handling of dirt in backfilling after the pole is set in place. The boring head is adjustable so that the hole is put down straight regardless of the position of the truck or tractor.

This machine is made in two sizes for mounting on either truck or tractor. Model C is for mounting on standard motor trucks of 1 to $2\frac{1}{2}$ -ton capacity. It is powered by the motor of the truck and standard installation details have been developed for all trucks using the unit power plant type of transmission. Standard equipment includes augers of 20 and 24 inches in diameter and a 13-inch rack-bar that will bore to a depth of 7 feet on level ground. The pole setting equipment consists of a Highway automotive winch and pole derrick.

Model D is mounted on a crawler equipped tractor. It is regularly equipped with a 13-inch rack-bar which permits boring to a depth of 7 feet and uses two augers of 16 and 20 inches in diameter. It is also equipped with a capstan winch and pole derrick. The winch has ample capacity to raise all poles that come within the range of the machine in hole diameters. It is gear driven, non-reversible while in gear and is provided with one speed forward and one reverse. The adaptability of the winch and derrick equipment is even greater in reconstruction work as they serve not only to set the new poles but will pull the old poles as well.



HEAVY BITUMINOUS DISTRIBUTORS

ETNYRE Model F



Write for Our Circulars

Sanford-Orlando Road No. 3, Florida, built up using "ETNYRE FULL WIDTH DISTRIBUTION"

THE MODERN METHOD OF BUILDING BETTER ROADS

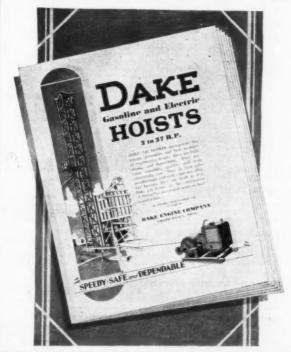
Asphalt heated to 340 degrees and applied with Etnyre Model F. First application 2 gallons per sq. yd., second application .7 gallons per sq. yd. Both applications made with 18 ft. spray bars.

E. D. ETNYRE & COMPANY,

Oregon, Ill.

Boston Toledo Lexington Richmond Columbia Memphis Jacksonville Houston Dallas E! Paso San Francisco Portland Salt Lake City Denver Jefferson City Chattanooga Los Angeles Sioux Falls Chicago Atlanta

ANNOUNCING



the NEW LINE of

DAKE

Gasoline or Electric

S-LG HOISTS

LIGHT

STRONG

DEPENDABLE

DAKE ENGINE COMPANY

Grand Haven, Michigan

Mail coupon today for Hoist Catalogue. It gives specifications, tables, and Hoist details.

Dake Engine Co., Grand Haven, Mich.

Gentlemen:

Send copy of your catalog illustrating and describing your complete line of Gasoline and Electric Hoists.

Name .

Address

City..... State......

The "Champion" Challenges Competition!

Check over the WILLIAMS "Champion" Bucket, and you'll find 21 distinctive improvements which make possible our unusual guarantee

That it will Outdig and Outlast any other bucket built.

> G. H. WILLIAMS COMPANY 600 Haybarger Lane, Erie, Pa.

> > Branch Offices:

Pittsburgh Chicago New York

Write for Bulletin "C," giving full description of this super - bucket.



ELECTRIC WELDED

Track Rings, Bands, Drip Rings and Many Other Circular Parts

In a wide range of sizes and shapes Rough or Machined

For Concrete Mixers, Tractors and Road Machinery

Let us help you with your problems

THE AMERICAN WELDING & MFG. CO.

Warren, Ohio

24 HOUR DELIVERY THRUOUT U. S. A.







POWER SHOVELS FOR EVERY MEED

Large or small power shovels, clamshells, draglines and many other types and sizes for use in the construction field are described in literature which may be secured by those interested from Bucyrus-Erie Co., South Milwaukee, Wis.

PAST LOADING EXCAVATORS

Bulletin 629 of the George Haiss Mfg. Co., Inc., 142nd St. and Park Ave., New York, N. Y., contains a description and many interesting pictures of Haiss excavators at work in all parts of the country and on all kinds of digging jobs, from mere akimming to 4-foot creding excavations.

HIGH EARLY STRENGTH CONCRETE

This is the title of a booklet which is published in two editions, one for those interested in Universal cement and its advantages for use in general building construction, and the other for paving contractors. Copies of either or both booklets will be furnished on request by the Universal Portland Cement Co., 208 South La Salle St., Chicago, Ill.

HANDLING AGGREGATES BY CONVEYOR

A circular describing the Conweigh pickup conveyor may be secured from the Conveying Weigher Co., 90 West St., New York, manufacturers of this gasoline or electric-motor-driven 18-inch belt conveyor which backs into the material to be loaded by power or turns around in its own length.

WAGONS FOR DIRT MOVING
Details regarding the advantages of Cat-Tread wagons on earthmoving jobs will gladly be sent by the Davenport Locomotive & Mfg.
Co., Davenport, Iowa, to contractors interested in these 5 and 7-cubic-

A NEW SHOVEL CATALOG

A new catalog on the Moore Speedshovel which is well designed and sturdily constructed and can safely handle heavy materials because of its low center of gravity, has been issued by the Manitowoc Engineering Works, Manitowoc, Wis.

The Loomis Machine Co., 10th St., Tiffin, Ohio, will gladly send a copy of its illustrated booklet to contractors interested in the self-propelling Loomis Clipper drill which is designed for drilling blast holes, building and foundation tests, mine air shafts, oil and water wells and stripping.

A WHEELED SCOOP OF LARGEE PROPORTIONS
Complete information in regard to the new WARGO 2-yard wheeled
scoop, which can be used in trains of two or more with a tractor
and which are used for excavating, transporting and spreading earth
on hanls up to and exceeding 2,000 feet may be secured from W. A.
Riddell Co., Bucyrus, Ohio.

A HANDY HAND TORCH

Complete information in regard to the Littleford hand torch, which is light and compact, can be held in any position and is equipped with a windshield permitting use in any weather condition, will be sent to those interested by Littleford Bros., 443-457 East Pearl St., Cincipacial Obio. Cincinnati. Ohio.

POWER PLOW SCRAPERS

POWER PLOW SURFFERS Information regarding the use of Garst power plow scrapers which present less resistance against the line of pull, eliminate hoist overstrain and prevent spilling of the load, may be secured without obligation from the Garst Mfg. Co., 549 W. Randolph St., Chicago, Ill.

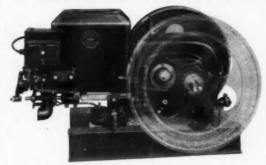
BLADES FOR GRADERS AND DRAGS
Grader blades for all makes of graders or drags, as well as snowplow blades, scarifer and rooter teeth, grader and snowplow moidboards, and steel frames and shapes to specifications, are made by
the Shunk Mfg. Co., Bucyras, Ohio, who will send complete information on request.

HEAVY BITUMINOUS DISTRIBUTORS
Circulars describing the Etnyre Model F heavy bituminous distributors are available to contractors writing to E. D. Etnyre & Co., Oregon, Ill.

FOUR AND SIX CYLINDER TRUCKS AND BUSSES

The White Co., Cleveland, Ohio, will be pleased to send complete information regarding its line of four and six-cylinder model trucks, light delivery, light duty, fast express and heavy duty trucks, as well as light and heavy duty tractors.

Dependable Power!



Cut of Engine with One Fly-Wheel Removed

The Horizontal-Type Completely Enclosed

STOVER ENGINE

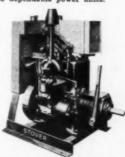
Absolute dependability is one of the chief requirements of an engine in the construction field. Even slight delays are both costly and inconvenient. The completely enclosed horizontal type Stover Engine was specially designed for heavy duty work, and wear and replacement has been reduced to the absolute minimum.

35 Years of Engine Building Experience

The inbuilt quality of Stover Engines has been famous for almost half a century. Current models, of the self-lubricating type pictured above, will add new laurels to their reputation. Distributors and users will be astonished at the advantages afforded by the 1930 line of these dependable power units.

STOVER Vertical Power Unit

In the vertical style these Stover Power Units are available in single and double and four cylinder type, with both hopper and radiator cooling systems. These units can be had with either crank shaft take-off to operate at full engine speed or cam shaft take-



Cut of Double Cylinder Power Unit with radiator cooling system and clutch. It can also be supplied in the hopper cooled

off to operate at half engine speed. Built-in clutch and various reduction gears are available at slight extra cost.

See Them At The Road Show

Be sure to see the Stover exhibit at the Road Show. See for yourself the many superiorities over other engines. Stover units are neat, compact, foolproof and can be had in sizes exchangeable with engines of similar horsepower rating, already in use. Ask for bulletin describing in detail either the horisontal er vertical Stover Power Units.

STOVER MFG. & ENGINE Co.
25 Lake Street
FREEPORT, ILLINOIS



"IRON MULES"

TWO of these tractor dumps will be exhibited at the Road Show at Atlantic City—the 4-yard with crawler tracks and power hoist, and the 2-yard with new spring mounting.

"Iron Mules" won't merely wish you a prosperous New Year. They'll make you one. "Pulling traction" and the fact that the driver is always facing the load are two of the reasons why Hughes-Keenan "Iron Mules" haul bigger daily yardages at less cost than trucks and teams. In any weather or going.

DUMP BODIES

A FEATURE of the exhibit will be the Hughes-Keenan mechanical power hoist, a powerful and efficient hoist of unique design—that will sell for a remarkably low price.

This hoist and the "Iron Mules" together with a number of the rugged, efficient Hughes-Keenan Dump Bodies will make an exhibit worth the time of the busiest contractor. The dump bodies will be in 1- and 1½-yard sizes equipped with hand hoist, gravity dump and mechanical power hoist.

See them. Main floor, space 111. Or mail coupon for illustrated folders.

THE HUGHES-KEENAN COMPANY MANSFIELD, OHIO

HUGHES-KEENAN Steel Dump Bodies

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TEAR OUT-MAIL TODAY

The New "TADCO" Parker Contractors' Pump

has all the time-tested merits of the original double diaphragm pump and in addition the following improvements:

More power (160 ft. head if necessary)
Greater pumping capacity (8000 gallons per hour of
dirty, gritty water)
Smaller gasoline consumption (1½ quarts per hour)
Lighter weight (890 lb.)
Automatic lubrication (transmission enclosed, run-

Automatic nuorication (transmission enclosed, run-ning in oil)

Greater dependability (more rugged construction and better protection)

As the Tadco Parker requires practically no attention, it will save its cost in three weeks on steady pumping jobs.

For further information address

THE TOOL AND DEVICE CORPORATION Waterford, N. Y.



* STAR BRAND *

HOISTING BLOCKS

Are Always Reliable

Made for Every Condition of Service Sold by Leading Supply Houses

Let us help you with your problems

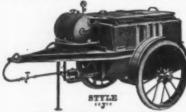
BOSTON & LOCKPORT BLOCK CO.

NEW YORK

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SPEED UP WORK BY USING



a Connery Style
"'J" eil-burning
kettle. Here's a
kettle that ankettle that answers all require-ments:—low fuel cost, quick heat-ing, relier-bearing wheels and springs, absolute temperature con-trol and solid rub-ber tires if de-sired.

We manufacture a full line of Tar and Asphalt Kettles, Oil Burning Kettles, Oil Burners, Torches, Pouring Pois, Hand Spraying Attachments, etc. Send for "Bine Book" describing our equipment.

Connery & Company, Inc.

4000 N. Second Street, Philadelphia, Pa.

"TEN TIMES MORE LIGHT"



Ten times more light than an oil lantern, and at less cost".

This remark by a railroad man explains why thousands of National Carbide Lanterns are being used today by contractors, miners, tunnel workmen, street repair crews, and others who want a dependable, strong, clear and penetrating light.

NATIONAL CARBIDE SALES CORP.

342 MADISON AVE., NEW YORK

Do you check over this list each month? Get the Habit. It will save you money to be up-to-date on equipment

A ONE-MAN TRACTOR SCRAPER

Literature describing the Schaefer one-man tractor scraper in 4, 5, 6 and 7-foot widths with a new auxiliary back-up control may be secured by those interested from Gustav Schaefer Co., 4180 Lorsin Ave., Cleveland, Ohio.

FOUR MODELS OF HYDRAULIC BULLDOZERS

A bulletin describing Baker hydraulic bulldozers, which are easily operated, work well below the track of the tractor and are built in four models for Caterpillar and Monarch tractors, may be secured from Baker Manufacturing Co., 585 Stanford Ave., Springfield, Ill.

A NEW INDUSTRIAL TRACTOR

The United industrial tractor, a modern low-cost power unit in either the wheel or crawler types and built by Allis-Chalmers Manufacturing Co., is described in literature which may be secured from the United Tractor & Equipment Corp., 612 No. Michigan Ave., Chi-

A PORTABLE TIMBER SAWING MACHINE
Complete data regarding the Wolf portable timber sawing machine
available in either electric or air-driven types and which will cut
timbers in confined spaces where it would be impossible to swing a
hand cross-cut saw, may be secured from the Reed-Prentice Corp.,
Worcester, Mass.

AN IMPROVED SHOULDER MACHINE

The Morits-Bennett Corp., Efingham, Ill., will be pleased to send to contractors complete information regarding the improved Moritz shoulder machine.

GASOLINE OR ELECTRIC HOISTS

A copy of the catalog illustrating and describing the complete line of Dake gasoline and electric S-LG hoists in capacities from 2 to 27 horsepower, will be sent on request by the Dake Engine Co., Grand Haven, Mich.

PORTABLE AIR COMPRESSORS

FORTABLE AIR COMPRESSORS

Complete information regarding the new M-W Air King portable air compressors which have full forced-feed lubrication, feather valves, indestructible all-welded frames, oil purifiers, gasoline gages and strainers, may be secured without obligation from Metalweld, Inc., 26th & Hunting Park Ave., Philadelphia, Pa.

SIX CYLINDER BOAD BOLLERS

The Hercules Co., subsidiary of the Osgood Co., Marion, Ohio, has recently developed the Hercules 6-cylinder road roller on which it will be pleased to send complete information and prices to interested contractors.

A PORTABLE ELECTRIC HAMMER

Literature describing the Speedway portable electric hammer for drilling, chiseling, channeling, tack-pointing, bush hammering in brick, concrete or stone, may be secured by those interested from the Speedway Manufacturing Co., Cicero, Ill.

ROAD REPAIR AND MAINTENANCE
Colphait, a cold process asphalt emulsion which is made from both
hard and soft asphalts in slow coagulating and quick coagulating solutions for coating new roads or resurfacing and patching old roads, is
described in literature which will be sent on request by the Colphait
Co. of Ohio, Cleveland, Ohio.

COMPRESSORS AND AIR AND ELECTRIC TOOLS

Complete information regarding Thor portable air compressors with the Rix super-charger, as well as Thor paving breakers, clay diggers, backfill tampers and calking hammers, will be sent on request by the Independent Pneumatic Tool Co., 248 So. Jefferson St., Chicago, Ill.

A broadside on Hughes-Keenan Iron Mules in 4-yard and 2-yard sizes and literature on Hughes-Keenan hand hoist, gravity dump and mechanical power hoist dump bodies may be secured without obligation from the Hughes-Keenan Co., Mansfield, Ohio.

CONVERTIBLE DIGGING MACHINES

Descriptive literature on the Buckeye Model O Utility excavator which is quickly convertible for clamshell, crane, backfiller or dragline work and which has full-circle awing and strictly one-man control, will be furnished on request by the Buckeye Traction Ditcher Co., Findlay, Oblin

REMOVING ICE ON ROADS

Contractors having problems of ice removal should secure a copy of the booklet of the Calcium Chloride Publicity Committee, representing the Columbia Products Co., Barberton, Ohio, the Dow Chemical Co., Midland, Mich., and the Solvay Sales Corp., 40 Rector St., New York.

A PUMPING HANDBOOK

The Novo Engine Co., 216 Porter St., Lansing Mich., will be pleased to send copies of the Novo Pumping Handbook to contractors interested in dewatering of excavations, etc., by the use of Novo diaphragm pumps.

EXPANSION JOINTS FOR CONCRETE ROADS

The Carey Elastite expansion joints for use in concrete roads, which are made of two layers of asphalt saturated felt with an inner filing of special asphalt composition are described in literature which those interested may secure from the Philip Carey Co., Lockland, Cincinnati. Ohio

1930 CALENDARS

A copy of the attractive Cletrae 1930 calendar will be sent on request to anyone desiring it by the Cleveland Tractor Co., Cleveland, O.



One-Man Automatic Tractor Scraper

(NOTHING TO REGULATE, OIL OR ADJUST)

The SCHAEFER One-Man Tractor Scraper has attained a prominent place in the contracting field because of the simple and easy way in which it moves earth at very low cost.

Write for our circulars

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SCHAEFER One-Man Tractor Scraper is furnished in 4-, 5-, 6- and 7-foot widths. It loads, dumps, spreads and levels—all operations are controlled from the tractor seat. It will pay you to investigate this scraper.

The Gustav Schaefer Company

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CLEVELAND, OHIO

Established 1880

- 10 REASONS WHY YOU SHOULD BUY A -

BURCH CAR UNLOADER

B It has a very rigid construction.

It is so easy to install.

It is powered by a high grade gas motor.

The steel chute is the best and cheapest method known to convey material from car to belt of unloader.

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The capacity is sufficient to keep a fleet of trucks running.

E It is easy transported.

It is built by a firm who specialize in this class of equipment. Considering first cost and cost of operation it is the most

economical method known of unloading material.

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THE -

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at the Road Show, where you can see for yourself this

EVERHOT

Branding Iron

Don't run the risk of losing your tools, wheelbarrows, ladders, etc., through being unable to identify them as your own. The EVERHOT will brand them for you for all time—they're yours beyond question.

The EVERHOT brands continuously—No "time out" for heating the iron.

What? You're not coming to the Road Show this year? Then write us for our circular describing this simple, inexpensive, efficient branding tool.



MORE FINISHED SURFACE PER DOLLAR . . .

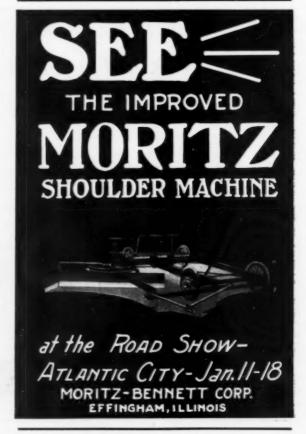
The BERG Hi-Way Surfacer produces larger areas of finished surface quicker and better than any other method. Low operating cost. Does the work of ten men. Eliminates the use of expensive equipment and large working crews. Effective on new or old work—concrete roads and concrete asphalt streets. Endorsed by state highway departments, municipalities, leading contractors and engineers. Send for interesting facts.



BERG



Power PLOW Scraper



"Blow-ups" from expansion can be prevented spalling can be eliminated cracking can be controlled by using CORKIN JOINTS

Corkin Expansion Joints safeguard concrete highways against their tendency to break down from within, when undergoing radical temperature changes. The Corkin Joints can be compressed 44 per cent and will return to within 5 per cent of its original thickness within 24 hours.

Ask for a sample



Manufactured by

The Colphalt Company of Ohio Western Reserve Building CLEVELAND, OHIO

ATLAS Portable Belt CONVEYORS

won recognition as the most adequate equipment.

Furnished equipped with electric motor or gasoline engine. Or you use your own power unit.

Lengths 15 to 100 feet; belt, 14-, 16-, 18- or 24-inch.

Cost of operation low; upkeep small. Large

For the moving or piling of material, the ATLAS Portable Belt Conveyor has

Cost of operation low; upkeep small. Large capacity for the amount of power required.
. . . It will pay you to investigate.



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Manufacturers of Bucket Elevators-Loaders-Tractors, Etc.

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Let Hayward Engineers rec-ommend a bucket to fit the job. The Hayward line in-cludes Clam Shell, Orange Peel, Drag Line and Electric Motor Buckets; Dredging, Excavating and Coal Handling Machinery; Automatic Take-up Reels; Counter-weight Drums.

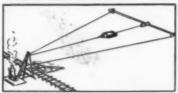
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THE CONTRACTOR'S FRIEND

Moves dirt when you want it and places it where you want it. Also, cleans lakes and builds dams.



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Manufacturers of Cable Drag Line Equipment

Eastern Office: 150-02 Sixth Avenue, WHITESTONE, N. Y.

GRADER BLADES

of Superior Quality FOR ALL MAKES OF GRADERS OR DRAGS

- Also -

SNOW PLOW BLADES, SCARIFIER and ROOTER TEETH, GRADER and SNOW PLOW MOLDBOARDS. STRUCTURALS, STEEL FRAMES and SHAPES TO SPECIFICATIONS FOR THE ROAD MACHINERY INDUSTRY.

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Established 1854

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LOOMIS "CLIPPERS"

This self-propel-ling Loomis "CLIPPER" drill is specially de-signed for your work. Fitted with crawler or round wheels. All levers are within easy reach of the oper-a to r. Steel or ator. Steel or wood frame fur-nished.



Blast Hole Drilling

The Loomis "CLIPPER" drill "CLIPPER" drill is unequalled for drilling blast holes, building and foundation tests, mine air shafts, coal prespecting stripping, mineral tests, oil and water wells. Write for our illustrated bulletin.

THE LOOMIS MACHINE CO.

10th Street

Tiffin, Ohio



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Handling Large Yardage on Long Hauls



Write for 96-page illustrated catalog

With a Sauerman Power Drag Scraper one man can excavate from 100 to 4,000 en. yd. of earth or gravel per day and move this material to a hop-per or pile. Pit crew and expensive haulage equipment both are eliminated. Sauerman machine costs less to install and operate than any excavator-conveyor of equal capacity.

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"The Strongest Geared Power for Its Weight in the World"

CAPACITY 5 TONS STRAIGHT LINE

POSITIVE INTERNAL INTERNA

Write for descriptive circular with users's endorsements and name of nearest dealer.



Weight 110-lbs.

Size 16x17x13-in. high Two Speeds

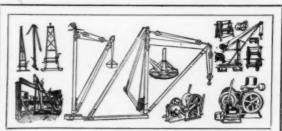
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We have a complete line of Derricks and Winches

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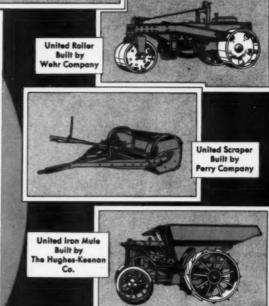
United Snow Plaw
Built by
Maine Steel Produc
Co.

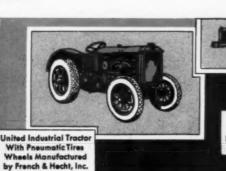
ERE is the tractor that Industry demanded . . . the UNITED . . . built by Allis-Chalmers to provide contractors and road builders with a low-cost power unit that stands the gaff and saves hours and dollars on the most rushed and difficult jobs.

The engineering knowledge of a half-century has gone into the design of the UNITED Industrial Tractor. Built along modern automotive lines, it will supply greater power (official tests show 24 h.p. on the drawbar and 35 h.p. on the belt), and take more abuse than you'll ever require of it.

Adapted to the widest possible range of work, the UNITED, in either wheel or crawler type, provides sturdy, economical power for the complete line of UNITED operating equipment.

Your UNITED Dealer is prepared to demonstrate how UNITED gives you greater returns for your investment! Write for details.







UNITED TRACTOR & EQUIPMENT CORP. 612 NO. MICHIGAN AVE. CHICAGO, ILLINOIS

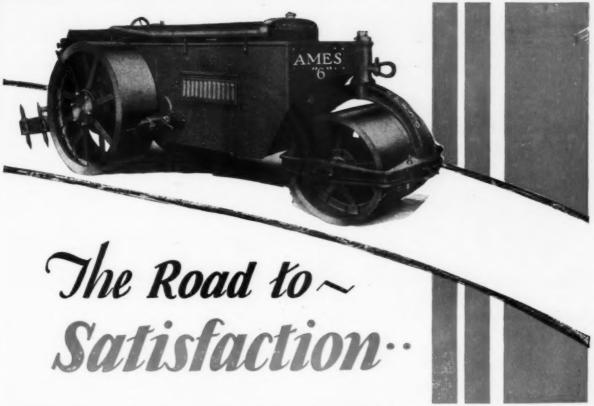


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The Hughes-Keenan Co.
Trackson Company
Universal Power Shovel Co.
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This roller was first exhibited at the Annual Road Show in 1929, at which time it created more than usual interest among road building contractors and public officials everywhere. Our chief aim was to have the best roller possible to produce, with every customer satisSales have exceeded CYLINDER fied. This we have done. production but with increased and improved manufacturing facilities we are now in position to meet in 1930 the ever increasing demand for these high grade rollers, now offered in 5, 7, 10 and 12 ton sizes, each with 6 cylinder motor only. There will be many new and interesting features on the 1930 models. See them at the Road Show. Make the AMES booth your headquarters and bring along your friends. There'll be a welcome awaiting you. We shall have

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Officials there to meet you Salesmen there to greet you Rollers there to please your eye Engineers to tell you why. THE FIRST
AND ONLY
SIX CYLINDER
ROLLER

AMES IRON WORKS

Division of Pierce, Butler & Pierce Mfg. Corp.

OSWEGO, N. Y.



Convert your **Danger Zones into** Safety Zones

Make it a thorough job. You can't afford to be half-hearted in your protection efforts. Toledo Torches are not just another means of protecting your construction work. They are the

only means that will fully protect

you from accident losses.



Toledo Torches are free from theft and breakage. They are always ready for service without attention. Our patented Economy Burner cuts the oil cost in half and insures perfect performance.

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(Collapsible) HORSES TOLEDO

It only takes a few seconds to attach these rigid pressed steel frames, to any handy piece of lumber. The operation is as simple as walking up-stairs.

No adjustable parts; no bolts; no nails. Yet ordinary thickness variations are readily accomodated.

The attachment is positive and absolutely rigid. When used under material platforms, a large factor of safety is assured, as

they will not yield or sway under tremendous loading.

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Available for use with one inch or two inch finished lumber.

A stock of TOLEDO HORSES will make you independent of material and labor conditions.

See our complete exhibit at the Road Show-Booth No. 619, or write for full particulars.

The Toledo Pressed Steel Company Toledo · Ohio



~ for Central Mixing Plants

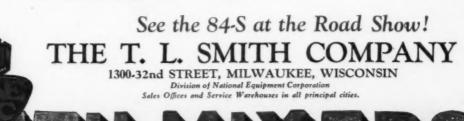
A BIGGER, better, faster mixer with the well-known SMITH dependability. And with many new profit-making features—

Improved Power Tilt Unit including Outside Friction Band Clutches — Adjustable Edge Rollers—Oversize Anti-Friction Bearings — S. K. F. Self-Aligning Ball Thrust Bearings for Main Drive and Cross Shafts — Faster Mixing Cycle — Designed to Produce UNI-FORM Concrete of any consistency on a High Production Basis.

The Smith is the Ideal mixer for dry readymixed concrete. The "Tilt and Pour" discharge is clean — COMPLETE — and fast. The ENTIRE batch pours DIRECTLY INTO THE TRUCK. Clogging is impossible. And mixing continues even during discharge —No chance for separation.

Available with Weigh-Mix

And with the new Smith Weigh-Mix, the 84-S weighs ALL the aggregates — stone — sand — cement — water — and then MIXES. There is a saving of 6 to 10 feet in height, and one man performs ALL operations. Write for the new 84-S catalog No. 829 — just off the press.



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Standard Paving Flux
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FEATURES OF THE "FLOR-OX" 35 and 50

ROLLER BEARING THRUSTS FOR FRICTION CLUTCHES

LESS WEIGHT AND SPACE WITH GREATER

POSITIVE RELEASE DEVICE ON FRICTION LEVERS

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THE "35" HAS A ROPE PULL OF 5000 POUNDS AT 165 FEET PER MINUTE THE "50" HAS A ROPE PULL OF 7000 POUNDS AT 165 FEET PER MINUTE

EXTRA HEAVY SHAFTS AND BEARINGS

SILENT CHAIN DRIVE ENCLOSED IN DUST

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S. FLORY MFG. CO.





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(COLD BLAST)

SHORT GLOBE LANTERN OF HIGHEST LIGHTING POWER

Use No other color means

danger

IKE lighthouses in a stormy sea Dietz Red Lanternsprotect the traveling public from the pitfalls along uptorn highways. No other warning lights are so universally understood and obeyednone are so economical.

Where large lanterns of highest lighting power are required for roadside warning Dietz Cold Blast No. 2 D-LITE Lanterns are a logical choice.

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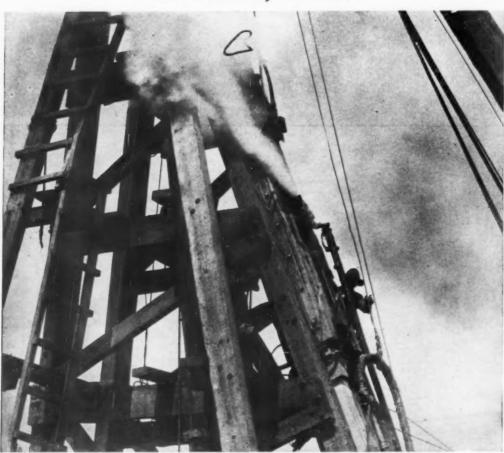
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in Iloilo, P. I.



THIS photo shows one of the UNION Pile Hammers being used by Tan C. Tee Co., Chinese contractors of Manila, P. I., in driving 20-inch square precast concrete piles for a big port job at Iloilo, P. I.

UNION Pile Hammers have been and are being used for driving some of the largest concrete piles

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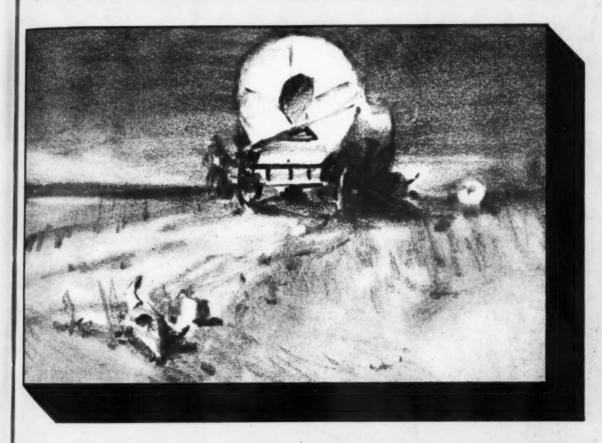
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Since wagon roads were made from buffalo trails



From the age of the pioneer, when wagon roads were made from buffalo trails—an unbroken chain of service connects Austin-Western with modern progress—the age of the engineer!

The tradition of the Austin-Western Road Machinery of today has been growing steadily from a time when the threat of the Indian hung over blue forests and great rolling plains—before there were railroads west of the Missouri.

Over seventy years of close contact with the problems of building and maintaining roads that have changed the face of a continent have brought to Austin-Western engineers a rich

heritage of knowledge based on experience.

As the years go by, new materials and ripened experience combine to bring about improvements in both product and methods that are important to everyone concerned with building, using or paying for roads.

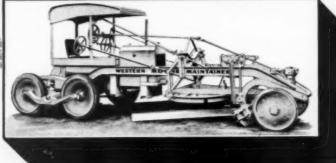
1930 finds Austin-Western ready with the most complete line of road machinery ever offered to road builders!

The Austin-Western organization is prepared to offer a continuation of the sort of service its many old friends in the road building field have learned to rely on through years of satisfactory dealings.

Austin-Western ROAD MACHINERY



The new Western Motor Maintainer is a tandem drive motor grader for lighter work than the Austin 10-20 usually performs. It weighs 7000 lbs. and carries an 8-ft. blade.



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Dual Drive Motor Graders

supply more power at no increase in operating costs—greater tractive efficiency—freedom from skidding or miring—easier handling.

The Austin-Western Dual Drive principle of design provides four great drive wheels—two pairs in tandem. This increased driving contact over four widely separated areas gives greater tractive efficiency than it is possible to

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Dual Drive Motor Graders always have sufficient traction to get through places that have hitherto caused graders to stall until dug out. With tractive effort applied over such a large area, there are still two or three drive wheels left on hard ground, even if one or two do run into soft or wet spots.

The forward drive wheel in each tandem presses down the softer ground and provides a solid footing for the rear drive wheels.

The tendency to side-slip or skid is checked in Dual Drive Motor Graders because, instead

of one rear wheel to serve as the pivot for a skid, the Dual Drive opposes a base line several feet long between the points of contact of two drive wheels in tandem.

Because of these features a steadily increasing number of Dual Drive Motor Graders of varying weights and power are being used by public officials and contractors.



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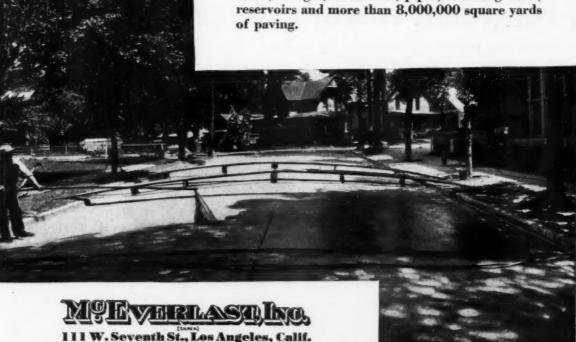
Battle Creek Streets Cured by "Hunt Process"

T 9 3 0 convention & ROAD SHOW A. R. B. A. Atlantic city k. J. 244-13-18

N Battle Creek, Michigan, where the City Engineer Department builds its own roads, the curing job on this concrete pavement was handled quickly and easily by the "Hunt Process."

Taxpayers of this residential district were enthusiastic about the efficiency of the "Hunt Process" cure. Compared to the old-fashioned dirt and water method it was a distinct relief—no dust or mud and the road opened to traffic several days earlier. It pleased the foreman on the job to be able to complete the curing job in a single, simple operation. And the inspector was more than satisfied with the uniformity of cure and greater strength of the concrete.

"Hunt Process" takes the grief out of the curing in any type of concrete construction. Used on dams, bridges, abutments, pipes, retaining walls, reservoirs and more than 8,000,000 square yards of paving.



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OSITIVELY a "closed circuit" plant—no oversize can escape into discharge hopper. Based upon 25% over 1" material—the plant

The Y-90 Plant with Elevator lowered, and Loading Conveyor removed—ready for the road.

Electrical or Gasoline Engine Power is optional. If preferred, can be driven by belt from independent power unit.

The Y-90 Plant is equipped with No. 1030 "GOOD ROADS" CHAMPION ROLLER BEARING REDUCTION CRUSHER

SKF Self-aligning Bearings Throughout



Showing Elevator erect and loading conveyor attached-ready for operation.

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Around the world Wood Hoists and Steel Dump Bodies haul and dump the loads for highway construction, economizing man power, saving millions in hand equipment, working in all kinds of weather without fatigue and making profits for their owners.

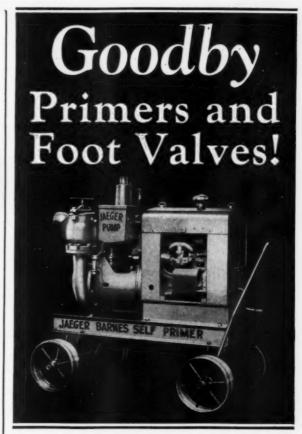
Our 18 years of experience in building hoists and dump bodies for dump truck men has taught us how to build dumping equipment to give maximum service and efficiency.



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Out Performing!

By sheer merit Baker Maney Self Loading Scrapers have held their high place in the estimation of practical dirt movers. By out-performing other equipment in their field, they are forcing their way into the equipment of thousands of contractors and road officials. Their performance speaks for itself.

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Model D, 11/2 yd., Model G, 1 yd., Model H, 3/4 yd.

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Baker
Hydraulic-lift
Bulldozers
with high lift
and floating action are made
for attachment
to both "Caterpillar" and
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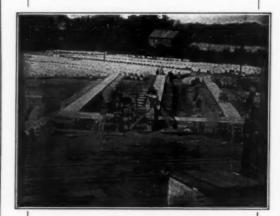
Baker Maney Self Loading Scrapers Baker Hydraulic Bulldozers

THE BAKER MANUFACTURING CO. 585 Stanford Avenue, Springfield, Illinois

See our exhibit, Road Show, Atlantic City



Easily laid at small expense with perfect flow line.

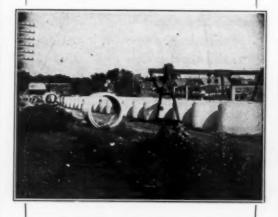


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See Them at Atlantic City



MANUFACTURERS! —You will insure satisfactory per-formance of your equipment by making Lauson Engines your standard motive power.

DISTRIBUTORS! -You will protect your reputation for supplying high grade, efficient equipment by spe-cifying machines powered by Lauson Engines:

-33 Years Highest Reputation Guarantees LAUSON Quality and Performance

Two New Smaller Size Lauson Engines will also be shown. Don't fail to see them.

Vertical Motors and Horizontal Gas Engines

Substantial, Light-Weight Automotive Type Verticals

Built Both Air- and Water-Cooled Specially suited for application to all sorts of portable and stationary units used by road builders and general contractors. They are compact and self-contained with all working parts built to endure continuous, hard service.
The Air-Cooled develops 1½ hp. at 1200 r.p.m. and may be run up to 2000 r.p.m. The Water-Cooled develops 11/2 to 21/2 hp. according to speed.

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We also build Concrete Mixers, Single - and Double - Diaphragm Pumpers, Heavy-Duty Power Units 35-60 hp., Contractors Saw Rigs, Plaster and Mortar Mixers and Contractors' Road Tractors.

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The JOHN LAUSON MFG. CO. 11 Jackson Street.

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COLPHALT—the world's finest cold process asphalt emulsion for making

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Note these points:

Applied cold-no heat required

Shipped ready for use

Can be applied when road is moist, and in any tem-perature above freezing

Traffic can continue while COLPHALT is being laid

Its high fluidity coats and penetrates all road in-gredients

It will not coalgulate in contact with cold road heds

Simple to apply by pres-sure distributors, direct from drums, or with sprinkling cans

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The COLPHALT COMPANY of OHIO

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Operating levers arranged on drum end, making effective ONE-MAN CONTROL. Powered with 4-cylinder, 12-hp. LeRoi gasoline engine. Thirteen heavy-duty Hyatt Bearings mean long life and easy running. Alemite pressure lubrication. Capacity: mixed concrete perhatch, 10 cubic feet. Get the complete specifications and low cost of this famous Lansing Mixer.

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Cat-Tread Wagons have a cordial disregard for weather or haulage conditions, too. No matter how unfavorable these conditions, Cat-Treads are always ready to make every



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Wagons in your 1930 equipment budget.

DAVENPORT CAT-TREAD WAGONS







This Machine Reduces Street Resurfacing Costs

Chausse Oil Burning Surface Heaters will save money and time for any city or contractor in repairing or resurfacing bituminous pavements. Detroit decreased their costs from \$1.22 to 97c per square yard, 25 per cent. Washington, D. C., Indianapolis, and many other cities are using them. Two men and one machine do work of a gang of pickers and save 2 inches of material.

These machines are moderate in price, economical and satisfactory in service. Made in standard models with 6 x 6 feet and 3 x 6 feet pans. Special sizes if desired. Write for descriptive circular.



Other products-Portable Asphalt Plants, Oil Burning Tar Kettles, Fire Wagons, and Kerosene Torches

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HAVE you deferred buying a trailer with the thought that it might be necessary to purchase an additional tractor?

Dismiss the thought. If you have a platform truck of proper capacity it can now be used as a tractor. Trailer can be attached quickly and as easily detached after hauling a load, to release the truck for other duty.

Write today for Catalog No. 28. Mention the kind and capacity of truck you propose to use.

Smooth, dustless Roads

Economical to build and maintain

ROADS that will not withstand year 'round heavy traffic can be improved without discarding the present paving. Just bring them up to date.

Such roads can be made into modern, farm-to-market highways with various treatments combining mineral aggregate with Standard Asphalt Road Oil or Stanolind Cut Back Asphalt. These road treatments do not strain the construction budget.

Thousands of miles of such improved highways in the Middle West have given many years of service with little expense for upkeep.

It will pay you to investigate before you build. Fill in the printed form below and mail it for full information.

Wisconsin State Highway No. 13 in course of construction. Treating subgrade of gravel with Standard Asphalt Road Oil. 300 to 400 yards of gravel to the mile. When completed, it is a goodroad in all kinds of weather.

Missouri Highway. Mixedin-place Method, using
Standard Asphalt Road Oil
and three inches of gravel.
Thousands of miles of road
built by this method are
giving good service in many
counties and cities in the
Middle West.



Linn County, Iowa. Retread construction. Showing first application of Stanolind Cut Back Asphalt mixed in place with mineral aggregate. September, 1929.



One of these four types of road surfacing will meet your present traffic conditions

Treatment of Sub-grades with Standard Asphalt Road Oil builds up a smooth, dustless, all-weather highway at very low cost. This method of building conserves the material gravel supply, and in this way it greatly reduces the cost of the road.

Mixed-on-the-Road Method of combining Standard Asphalt Road Oil and Gravel gives a three-inch bituminous bound, smooth surface. This type of road can ordinarily be constructed and maintained as cheaply as an ordinary gravel road.

Surface Treatments with Stanolind Cut Back Asphalt are used successfully wherever the road to be treated is constructed of a well compacted mineral aggregate.

Stanolind Cut Back Asphalt retread (or mixed-inplace method) is an economical means of salvaging old bases of gravel or crushed rock. This type of pavement, mixed on the road, is constructed by mechanical means, which results in very low construction costs.

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Johnston Boilers have proven their value on engineering projects the world over. They are built by an organization that has been building good boilers for over 65 years. When you have a boiler problem you may find our experience worth while. Call on us then.

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Skip Shaker loader, remixing drum action, Accurate Measure Water Tank and fast discharge (8 to 11 seconds) mean more thoro mixed concrete per day. Machined steel tracks, chilled ground faced rollers and ball bearings save power, save wear. Direct drive, one man control, dual tires for soft and hard ground.

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EVERYWHERE



Bucket Elevator Conveying and Screening Material Into Hopper

CHICAGO AUTOMATIC CONVEYORS

Are cutting, loading and unloading costs for thousands of contractors

Write for Descriptive Bulletins

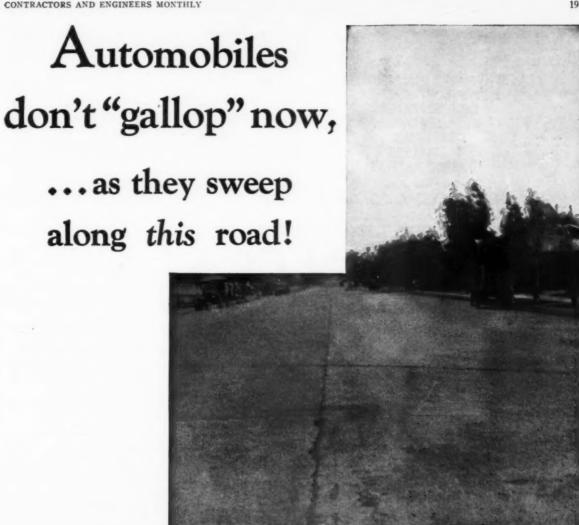
CHICAGO AUTOMATIC CONVEYOR CO.

Originators of the Portable Conveyor

1853 South 55th Ave. Cicero, Illinois

Manufacturers of
Portable and Stationary Belt and Bucket Type Conveyors
and Loaders—Shaker Screens
Agents in all principal cities





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T'S crossed longitudinally and transversely with Elastite, the pioneer Expansion loint. Permanently built pansion Joint. Permanently buckle-proofed-smooth, the year around.

Carey Elastite Expansion Joint is made up in "sandwich" form—two tough strips of asphalt-saturated felt, with a filler of asphalt and fibre. Climate-proof -uniform in texture and consistency, at one hundred degrees or at zero. Economical. Used by municipalities everywhere in the construction of concrete roadways, bridges, dams and culverts. Indispensable; it protects the concrete lastingly against expansion and contraction strains. Have us send you particulars about Expansion Joint installation.



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The overwhelming choice of the builders of high quality equipment. Favored by contractors everywhere.

EISEMANN MAGNETO CORPORATION 165 Broadway - New York

SEE THEM AT THE ROAD SHOW



Helping To Make— Road Building History

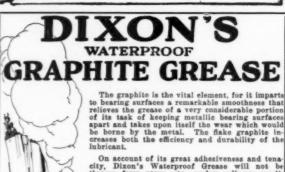
In the construction and maintenance of our roads and streets, Buffalo-Springfields are enacting a major role. Sound engineering principles, resulting in unusual roller service, have won for this particular make of equipment, an enviable place in the confidence and judgment of those who are making road-building history.



Both steam and motor driven models and all practical sizes. Attachments when desired. Write for interesting booklet.

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Springfield, Ohio



On account of its great adhesiveness and tenacity, Dixon's Waterproof Grease will not be thrown from gears, etc., under ordinary conditions. It is not wasted by dripping and cannot be washed off by water. It not only lubricates but is a sure rust preventive as well.

These properties highly commend its use upon; wire ropes, chains, exposed gears, cranes, derricks, dredges, steam shovels, pump plungers, hoisting ongines, or any other machinery requiring a heavy-duty or waterproof lubricast.

Write for Circular No. 148-W



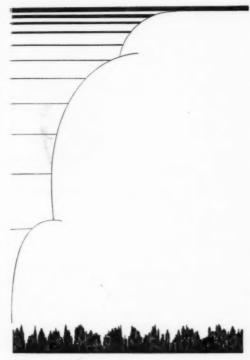
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Jersey City

New Jersey



THE GREAT SKYLINES OF TODAY TELL THE STORY OF THIS ADVANCE IN CONCRETE CONSTRUCTION



CALCIUM CHLORIDE ... for Accelerating and Curing Concrete

In order to make available to all the trades and industries concerned the benefits of the use of Calcium Chloride, the Calcium Chloride Publicity Committee offers them impartial and authoritative information...In requesting information address any of the companies listed below and ask for booklet 443

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THE COLUMBIA PRODUCTS COMPANY
Barberton, Ohio

THE DOW CHEMICAL COMPANY
Midland, Michigan

SOLVAY SALES CORPORATION
40 Rector Street, New York

... Still Greater Advances Are Forecast as the Full Facts About the Use of Calcium Chloride Are Brought to Light . . .

The value of Calcium Chloride in concrete construction is a story written across great skylines. Among the best known of today's impressive structures are those in whose building the use of Calcium Chloride played an important part.

In steadily increasing numbers those concerned with construction are turning to the use of Calcium Chloride for the solution of many extremely difficult problems. For through the use of Calcium Chloride the finishing of concrete floors is speeded up, made more efficient and economical. Cold weather concreting is made a practical and profitable undertaking. The set of the concrete is accelerated and great early strength is assured.

Of vital importance is the fact that Calcium Chloride presents the only means by which the concrete used in structures can be cured... And it is a common experience that contractors and engineers who have adopted the use of Calcium Chloride to gain ONE advantage, have been deeply impressed with the many other advantages achieved.

You owe it to yourself to investigate the possibilities Calcium Chloride offers to you and those for whom you build. A request for booklet—together with your name and address forwarded to any member of the Calcium Chloride Publicity Committee, will bring you complete information.

CALCIUM CHLORIDE

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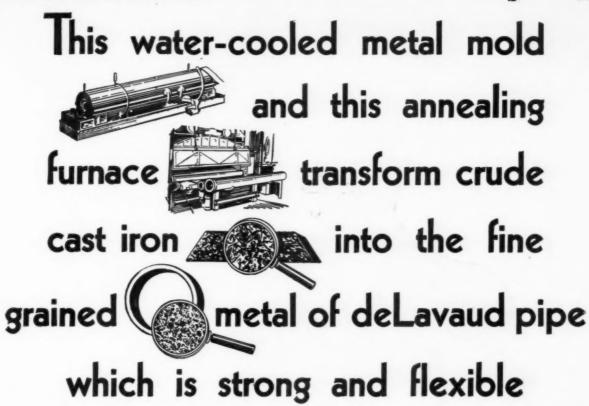
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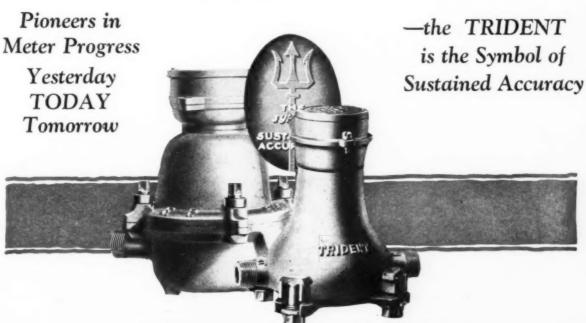
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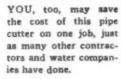
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